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EIGHTH ❧ ❧ ❧ ❧
ANNUAL CATALOG

MONTANA STATE COLLEGE

❧ OF ❧

AGRICULTURE

❧ AND ❧

MECHANIC ARTS

BOZEMAN, MONTANA.

1899 - '00

❧

General View of Buildings

EIGHTH ANNUAL CATALOG

MONTANA STATE COLLEGE

= = OF = =

AGRICULTURE

= = = AND = = =

MECHANIC ARTS,

BOZEMAN, = = = MONTANA.

FOR THE ACADEMIC YEAR 1899-1900

AND ANNOUNCEMENTS

FOR 1900-1901.

BOZEMAN CHRONICLE
1900

1900	SUN.	MON.	TUES.	WED.	THURS.	FRI.	SAT.
JULY.	1	2	3	4	5	6	7
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AUG.	..	..	..	1	2	3	4
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1901	SUN.	MON.	TUES.	WED.	THURS.	FRI.	SAT.
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CALENDAR FOR 1900-1901.

Registration	Monday and Tuesday, Sept. 17 and 18, 9 A. M.
Examinations for Entrance and Conditions	Monday and Tuesday, Sept. 17 and 18, 9 A. M. and 1:15 P. M.
First Semester begins	Wednesday, Sept. 19, 8:40 A. M.
Thanksgiving Recess begins	Thursday, Nov. 29.
“ “ ends	Monday, Dec. 3, 8:40 A. M.
Winter Vacation begins	Saturday, Dec. 22.
“ “ ends	Monday, Jan. 7, 1901, 8:40 A. M.
Examinations begin	Monday, Feb. 4, 9:00 A. M.
First Semester ends	Friday, Feb. 8.
Second Semester begins	Monday, Feb. 11, 8:40 A. M.
Examinations begin	Monday, June 10, 9:00 A. M.
“ end	Friday, June 14.
Baccalaureate Day	Sunday, June 16.
Exhibition of Literary Societies	Monday, June 17.
Preparatory and Business Department Graduation	Tuesday, June 18.
Commencement Day, Second Semester ends	Wednesday, June 19.

1901-1902.

Registration	Monday and Tuesday, Sept. 16 and 17, 9 A. M.
Examination for Entrance and Conditions	
First Semester begins	Wednesday, Sept. 18.

MONTANA STATE BOARD OF EDUCATION.

Governor Robert B. Smith. (ex-officio)	Helena
Attorney General C. B. Nolan, (ex-officio)	Helena
State Supt. of Public Instruction E. A. Carleton, (ex-officio)	Helena

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H. R. Melton	Dillon
M. J. Garrett	Lewistown
(Term expires February 1st, 1901.)	
J. M. Hamilton	Missoula
J. P. Hendricks	Butte
(Term expires February 1st, 1902.)	
N. W. McConnell	Helena
O. F. Goddard	Billings
(Term expires February 1st, 1903.)	
O. P. Chisholm	Bozeman
J. G. McKay	Hamilton
(Term expires February 1st, 1904.)	

OFFICERS OF THE BOARD.

Governor Robert B. Smith,
President.

J. M. Hamilton,
Vice-President.

E. A. Carleton,
Secretary.

EXECUTIVE BOARD,

In Charge of the College and Experiment Station.

Lester S. Willson..Bozeman
(Term expires February 1st, 1901.)
Peter Koch..Bozeman
(Term expires February 1st, 1902.)
Walter S. Hartman..Bozeman
(Term expires February 1st, 1903.)
John M. Robinson..Bozeman
(Term expires February 1, 1903.)
George Kinkel, Jr..Manhattan
(Term expires February 1st, 1904.)

OFFICERS OF THE BOARD.

Lester S. Willson,
President.

George Kinkel, Jr.
Vice-President.

Peter Koch.
Secretary and Treasurer.

FACULTY.

JAMES REID, A. B. (McGill Univ.), PRESIDENT,
Professor of Mental, Moral and Political Science and Astronomy.
S. M. EMERY,
Professor of Horticulture.
FRANK W. TRAPHAGEN, PH. D. (Columbia), F. C. S.,
Professor of Physics, Chemistry and Geology.
MRS. F. E. MARSHALL,
Professor of Art.
W. H. WILLIAMS, B. E. E. (Univ. of Wisconsin),
Professor of Mechanical and Electrical Engineering.
W. F. BREWER, M. A. (Harvard),
Professor of Latin and English.
AARON H. CURRIER, A. M. (Oberlin),
Professor of French and German.

....
Professor of Military Science and Tactics.
MISS LILLA A. HARKINS, M. S. (S. Dak. Agr. Col.),
Professor of Domestic Science.
ROBERT S. SHAW, B. S. A. (Ontario Agr. Col.),
Professor of Agriculture.
J. W. BLANKINSHIP, PH. D. (Harvard),
Professor of Botany.
SAMUEL FORTIER, MA. E. (McGill Univ.),
Professor of Civil Engineering.
R. A. COOLEY, B. S. (Mass. Agr. Col.),
Professor of Zoology and Entomology.
H. G. PHELPS,
Principal of Business Department.
MISS M. A. CANTWELL,
Principal of Preparatory Department.
W. M. COBLEIGH, E. M. (Col. of Montana,) A. M., (Columbia Univ.),
Instructor in Physics and Chemistry.
MISS MAY TRAVIS, A. B. (Univ. of N. Dakota),
Instructor in Mathematics.
E. B. McCORMICK, S. B. (Mass. Inst. of Tech.),
Instructor in Mechanical Engineering.
MISS HELEN R. BREWER, A. B. (Iowa Col.),
Instructor in Latin and History.
MISS VIRGINIA H. CORBETT, B. L. (Iowa State Col.),
Instructor in Preparatory Department.

MISS EMMA STOCKINGER,
Instructor in Stenography and Typewriting.
*MISS KATE CALVIN,
Piano.
MRS. W. F. BREWER,
Piano.
MRS. MARY WINTER,
Librarian.

LABORATORY ASSISTANTS.

ED. BURK.
Student Assistant in Chemistry.
FRANK A. SPRAGG,
Student Assistant in Chemistry.
HOMER C. THOMPSON,
Student Assistant in Botany.
JESSE A. DAVIDSON,
Student Assistant in Physics.
MISS FLORENCE BALLINGER,
Student Assistant in Domestic Science.
MISS POLLY DAVIDSON,
Student Assistant in Rhetoric.

EXPERIMENT STATION STAFF.

S. M. EMERY, Director,
Horticulturist.
F. W. TRAPHAGEN,
Chemist.
J. W. BLANKINSHIP,
Botanist.
R. S. SHAW,
Agriculturist.
SAMUEL FORTIER,
Irrigation Engineer.
ROBERT A. COOLEY,
Zoologist and Entomologist.
W. M. COBLEIGH,
Assistant Chemist.
HENRY C. GARDINER,
Assistant in Experiment Station.

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*Absent in Europe on leave, 1899-1900.

HISTORY AND ENDOWMENT.

The College of Agriculture and Mechanic Arts is organized under an act of Congress of July 2, 1862. This act appropriated public lands to the several states for the purpose of aiding in the maintenance of colleges,

> "where the leading object shall be, without excluding the scientific and classical studies, and including military tactics, to teach such branches of learning as are related to the Agricultural and Mechanical Arts."

The State of Montana, by an act approved Feb. 16. 1893, accepted and claimed the benefits and endowments provided under the Acts of Congress of July 2, 1862, and Aug. 30, 1890, the latter of which provides for the further endowment of the colleges.

The income of the College is derived from the proceeds of the sale and lease of public lands donated to the State by the Federal government for the College, and which amount to 140,000 acres. An additional sum of $25,000 is appropriated for the year ending June 30, 1900, under the Second Morrill Act of Aug. 30, 1890, and by the terms of the law the College will receive this amount each year hereafter. These funds with the addition of the State appropriations and the fees of students make a fairly liberal income.

Trustees.—The general control of the institution is in the hands of the State Board of Education. The direct supervision is vested in an Executive Board of five members, one of whom is appointed yearly by the Governor, subject to the approval of the State Board of Education.

THE EXPERIMENT STATION.

In connection with the College, an Agricultural Experiment Station has been established The object of this station is to further the interests of the agricultural industries in the state of Montana. This is done by conducting researches and experiments which may include the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of Montana as may seem advisable. For the support of this important department, the United States government appropriates yearly the sum of fifteen thousand ($15,000) dollars.

GENERAL STATEMENT.

The Montana State College of Agriculture and Mechanic Arts is the state school of applied science. The purpose is to give the young men and women of Montana an opportunity to acquire a good college education in mathematics, literature, science and art. The practical feature in instruction is emphasized, and while the text book, recitation and lecture are employed, the student is required to put into practice, as far as possible, the instruction he receives. This is attained by means of well equipped shops and laboratories. The work of the College is characterized throughout by the combination of the theoretical and practical.

Being a state institution, instruction is free to all residents of Montana of suitable age and acquirements. A small entrance fee is charged to cover incidentals, and laboratory fees sufficient to cover the cost of material. The following departments are maintained:

The Collegiate Department, with eight four-year courses leading to appropriate degrees:

I. Course in General Science.
II. Course in Agriculture.
III. Course in Biology.
IV. Course in Chemistry.
V. Course in Home Science.
VI. Course in Mechanical Engineering.
VII. Course in Electrical Engineering.
VIII. Course in Civil Engineering.

The Preparatory Department, with a three-year course.

The Business Department, with one-year courses in Bookkeeping, and Stenography and Typewriting.

The Art Department, with a four-year course.

The Music Department, with a four-year course.

MATERIAL EQUIPMENT.

LOCATION.

The site chosen for the college buildings and campus is one of the most beautiful that could be imagined, being an elevation southwest of the city of Bozeman, and within the city limits. The city has been fitly named "Bozeman the Beautiful," seated as it is at the head of one of the most fertile valleys in the world, and enclosed by the peaks of the Bridger and Gallatin mountains. In the vicinity are some of the most picturesque canyons, and the botanist and geologist can nowhere find richer fields for study and observation.

In economic resources, both agricultural and mineral, and in scenic effects, nature has been most generous.

THE CAMPUS AND FARM.

The grounds and farm now contain about two hundred and thirty acres. Of this over sixty acres in the immediate vicinity of the buildings, including a recent purchase of eleven blocks of the Capitol Hill addition, adjoining the campus on the south and east, constitute the campus and recreation grounds, sites for buildings and laboratories. The remainder is devoted to farming and experimental purposes.

BUILDINGS.

The Main Building, situated in the center of the college campus, is a substantial structure of brick and stone, of practically fireproof construction, having a total length of 128 feet and a width of 90 feet. It is three stories high, and has a large, well lighted basement, which furnishes quarters for the Domestic Science department and three class rooms. The first floor contains the library, four offices, and three large class rooms. The north half of the second floor is devoted to the Art department, the arrangement being such that the three large rooms can be thrown together, by sliding doors, for exhibition purposes. The south half of this floor is fitted up entirely for the use of the Business department, the arrangement being that of the best business colleges. The third floor contains the large assembly room, a draughting room, and six laboratory and music rooms. The building is well lighted and commands a magnificent view of the Bridger and Gallatin mountains, and the whole of the beautiful Gallatin valley. All the laboratories and offices are furnished with gas, and the whole building is lighted with electricity from our experimental plant in the engineering laboratory.

The Chemical and Physical Laboratory located west of the main building, is sixty by ninety feet in dimensions. It is built of pressed brick, and has two observatory towers, one at each end, and is three stories high including the basement.

There are two entrances, one at the north end, the other at the south. A very large stack containing flues for ventilation of the hoods and furnaces passes up through the center of the building.

The basement is occupied by the laboratory of advanced physics, with desks for twelve students, and the assay laboratory arranged for eight students. In addition to these, there are rooms for the preparation of samples for analytical work, with power crushing and grinding machinery. A large room is also available for a museum.

The main floor is occupied by the office and library, a lecture room to accommodate one hundred students, a preparation room, a small class room, and the experiment station laboratory.

The second story contains the laboratory for elementary physics, with sufficient capacity for forty-eight students, the laboratory for physical measurements for twenty-four students, the qualitative laboratory for twenty students, the quantitative laboratory for twelve students, and the mineralogical laboratory for twelve students. The instructor's laboratory is so situated as to give him oversight of all the laboratories, and renders it easy for a student to consult with him at any time.

The north tower is used for a meteorological observatory, and a fine set of registering instruments is installed in it.

The Shop Building is a one-story frame structure, 60 by 100 feet, situated back of the main building, and contains a machine shop 44 by 72 feet, a forge shop 27 by 30 feet, office, tool room, wash room, engine and blower room, and boiler room. The large blower which ventilates the main and chemical buildings is located here, and is connected with those buildings by underground ducts.

The Engineering Laboratory is a two-story stone building, 33 by 52 feet, located 260 feet east of the shop buildings, and receives its steam supply from the main boiler through underground piping.

The Drill Hall is a one-story frame structure, 60 by 100 feet, situated between the chemical building and the experiment station, and is designed especially for military and athletic purposes.

The Experiment Station building is brick veneered, two stories high, with a large basement, and is situated on the west side of the campus, adjoining the experiment farm. It has sixteen rooms, and contains the biological laboratories, the offices of the director and the agriculturist, and rooms for the director's residence.

The Gymnasium is a two-story frame building situated at the southeast corner of the college yard. It is equipped with a fair amount of new apparatus, and is the latest addition to the college equipment.

EQUIPMENT.

The Chemical Lecture Room is equipped with a porte-lumiere for use in experiments requiring projection. When cloudy weather interferes with the use of the port-lumiere, the electric arc lamp or the oxyhydrogen lantern may be used for projection, all these instruments being arranged so as to be interchangeable.

A lecture desk extends across one end of the room, and is supplied with water, gas and electricity, and with a hood which permits the making of experiments with which objectionable odors are associated.

A sufficient amount of apparatus has been secured to illustrate all of the important laws and phenomena of chemistry.

Physics.—For lecture room demonstrations in physics there is a very large and carefully selected line of apparatus, with which it is possible fully and practically to illustrate the subject. An enumeration of the individual pieces would require much more space than is available in this catalogue, hence it is omitted.

Elementary Physics.—The instruction in elementary physics being given entirely by the experimental method, a considerable supply of apparatus is required. The more important pieces are an Atwood's machine, balances and pyknometers for specific gravity determinations, spring balances for the resolution and composition of forces, air pump, Mariotte's tubes, rotating machine, siren, color discs, lenses, prisms, photometer, Holtz machine, electric batteries, galvanometers, dynamos, motors, and all the additional material required for a thorough elementary course.

Advanced Physics.—The laboratory work in advanced physics is that outlined in Sabine's Laboratory Course in Physical Measurements, which is Physics C of Harvard University. The course consists of a very carefully selected series of experiments. All of the apparatus necessary for this work is available, among which are micrometer callipers, a spherometer, balances, a torsion pendulum, a sonometer, a Kundt's tube, organ pipes, a Bunsen's photometer, a fine spectrometer, a magnetometer, a tangent galvanometer, a horizontal magnet, a D'Arsonval ballistic and dead beat galvanometer, a standard ohm, a Carhart-Clark standard cell, condenser, rheometer, Wheatstone's bridges, wire and box forms, batteries, etc.

The Assay Laboratory is provided with pulp scales for each student, five-button balances, five Hoskin's crucible furnaces, large size, one No. 4 and four No. 3 Hoskin's muffle furnaces, one Brown's combination furnace, two power crushers, and a power grinder run by a 2 H-P. gasoline engine, a grinding plate, and a full set of samples illustrating every variation of ore in mine, mill, and smelter.

The Laboratory for Qualitative Analysis, besides desks and fume closets, has a large desk for special operations, every requisite for successful work being supplied.

In Quantitative Analysis, the students may draw from the supply room any apparatus they may desire for their work, consisting of platinum crucibles, dessicators, measuring flasks, pipettes, beakers, flasks, burettes, reagent bottles, stoves, etc.

One corner of this room is separated from the remainder by a sash partition, and serves for the balance room.

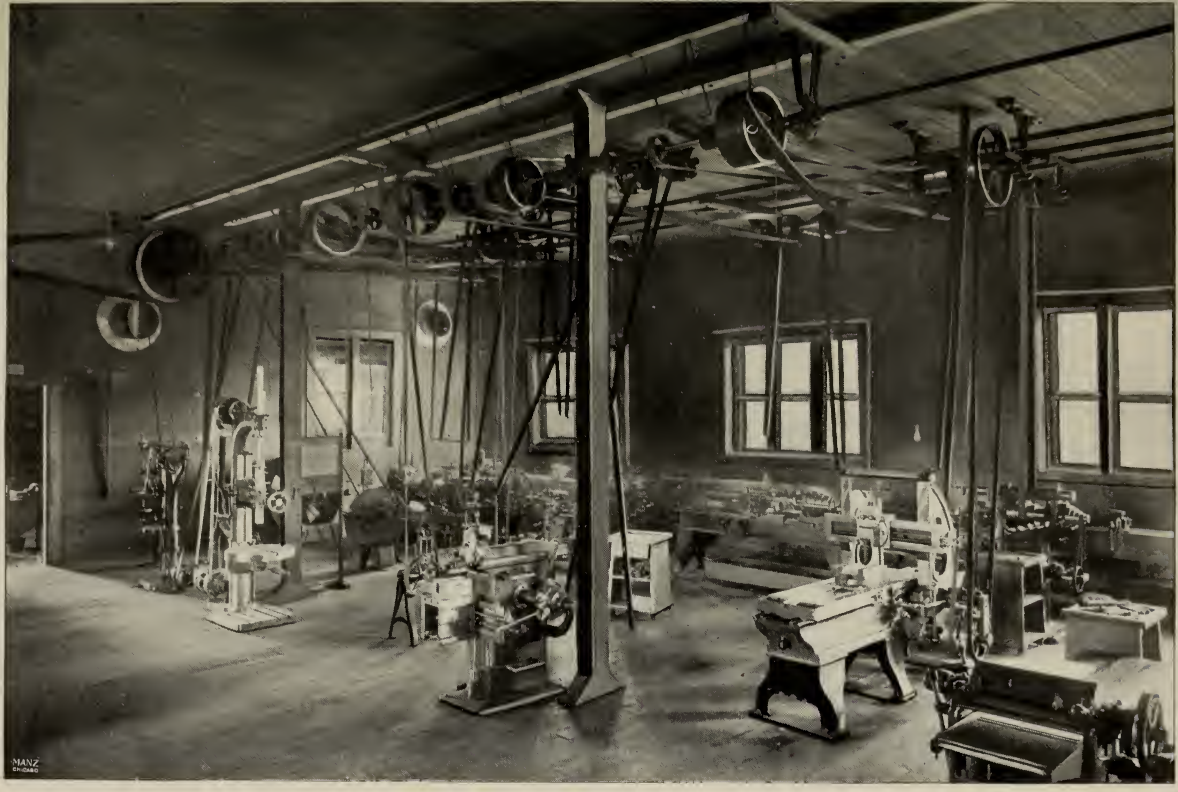
In Addition to the Standard Reference Books in science and the principal books on its different branches, the department library contains the following complete files of scientific journals:

American Journal of Science and Arts, Journal of the American Chemical Society, Journal of Analytical and Applied Chemistry, Berzelius' Jahresbericht, Jahresbericht uber die Fortschritte der Chemie, etc., Berichte der deutschen Chemischen Gesellschaft, and many sets, more or less complete, of other journals.

This makes a reference library which is very valuable, and which will afford excellent material for aid in scientific research, covering, as it does, the progress of the science since 1820.

The Collections in mineralogy, geology and economic geology are very fine and extensive, and cover all the geological horizons.

The private collection of the professor, for many years used for the purpose of instruction, has been acquired. It is particularly rich in minerals of economic importance. The collection exhibited by Montana at the Columbian Exposition was presented by the state to the College, and gives an excellent view of our state's mining resources. A very large amount of duplicate material is constantly being



Machine Shop

used to increase our collections through the medium of exchange.

Two sets of crystal models, and the crystallized specimens in the collection are available for instruction in crystallography.

Shops.—The equipment in this line is now complete, and consists of the latest patterns of standard machines from the best makers in the country. Before selecting this machinery, the shops of several of the most prominent engineering schools in the United States were studied, and the aim has been to make our equipment a model one. Power is furnished by one of the latest type Imperial high-speed engines, of 65 H-P., which also drives the blower.

For Woodworking, five double and three single carpenter benches are provided, making accommodations for thirteen students at a time. Each side of these benches contains two drawers with complete sets of carpenter tools, and two lockers for exercises. Twenty-six students can therefore be accommodated, each having an individual set of tools, for the care of which he is held responsible. For wood turning and pattern making there are eight speed lathes, a pattern-making lathe, a scroll saw, a double revolving rip and cross-cut saw, a variety wood-worker, and a 20-inch surface planer.

For Machine Work there are four screw cutting lathes of 16-inch swing and one of 18-inch swing; 13-inch, 20-inch, and 28-inch drills; a universal milling machine, a 16-inch shaper, a 22-inch by 22-inch by 6-foot planer, a universal tool grinder, a cutter and reamer grinder, a polishing lathe, and a shop saw. Benches for twelve students are provided. There is also room for additional equipment as the needs may develop. The tool room is well supplied with small tools, and the wash room contains lockers for students' use.

The Forge Room contains ten forges. All the piping for both blast and exhaust is of tile and placed under the floor. The forges have down draft exhaust, keeping the room free from smoke and giving a very neat appearance. There is a full equipment of anvils and other necessary tools, and a power shear for cutting up stock.

The Engineering Laboratory contains, at present, a 40 H-P. Woodbury high speed engine especially designed for experimental work, a 15 H-P. vertical high speed engine, a 15 H-P. Advance compound traction engine, gauges, calorimeters, indicators, absorption brakes, several sizes of platform scales, tachometers, and similar apparatus for the study of steam engineering. The shop engine is also fitted up for experimental work.

For the testing of materials, there is a Riehle standard automatic and autographic screw power testing machine of 100,000 pounds capacity with auxiliary instruments, fitted up also for beam testing; an Olsen torsion testing machine capable of breaking a specimen 1½ in. by 5 ft.; and a Fairbank's cement testing machine.

For electrical work the College owns two specially designed multipolar dynamos, each of 15 K-W. capacity at 125 volts. They can also develop 225 volts, and are arranged with commutator at one end and 6 collector rings at the other, so as to give one, two and three phase alternating currents. The two machines thus give a large number of combinations. Besides these, there is a 6 K-W. bipolar dynamo, a 15 light arc dynamo, a 6 H-P. direct current motor, a 5 H-P. direct current motor, a 5 H-P. 3-phase motor, and a good supply of rheostats, lamps, voltmeters, ammeters aud wattmeters of the latest patterns. Some new machines will be added the coming year, besides transformers, recording wattmeters, etc., making the equipment complete and thoroughly up to modern standards.

For the study of steam boilers the 85 H-P. return tubular boiler in the shop building is available. Apparatus is provided for measuring feed water, fuel, and everything necessary for complete boiler tests.

Surveying Instruments.—In this line the College has two transits, one with solar attachment; two levels, a field compass, a plane table, a sextant, and chains, tapes, and rods of various kinds.

Water Measuring Instruments include three current meters, two automatic recording water registers, test weirs, and other auxiliary apparatus.

The Art Department has a good equipment of casts in busts, masks, parts of the human figure, ornament, and geometric solids; benches and tools for wood carving and clay modeling; photographic copies of sculptures and world pictures. During the past year there have been added to the casts already in the department, the Nike, Venus de Milo, the Running Gladiator, several Indian heads, and others.

The Kitchen Laboratory is a large room provided with cupboards, and conveniently furnished with tables, sinks, range, an Aladdin oven, and a good supply of cooking utensils of all kinds. Individual work tables are provided for the use of each student. These tables have a full equipment of cooking utensils.

Opening from the kitchen is a dining room, with sideboard well supplied with table linen, dishes and silver. On the other side of the kitchen, a large room has been fitted up for a student lunch room where lunch may be served to students during the winter months.

The Sewing Room is furnished with a large cutting table, small sewing tables, three sewing machines, and cases for work. This handsome and spacious apartment is also used for reception purposes.

The Botanical Laboratories on the two upper floors of the experiment station building, are fitted for the accommodation of about 35 students. The apparatus available for work in this department, consists of nine compound microscopes, two of which have all modern accessories for high-power work; stage and eye-piece micrometers, a Wollaston and an Abbe camera lucida, a sliding microtome, paraffin and water baths, 26 dissecting microscopes, with the necessary stains, reagents, etc,, required for histological, morphological and systematic botany. There are also hot air and steam sterilizers, an incubator, a Wulfhuegel counting apparatus and other accessories needed for bacteriological work.

The Herbarium now contains 3,500 sheets of Montana species, 700 from Wyoming and about 1,500 mounted Phanerogams from other parts of the United States. There have also been secured sets of Cummings, Williams, and Seymour's *Lichenes Boreali Americani* (250 specimens,) Renauld & Cardot's *Musci europæi exsiccati* (200 specimens), Collins, Holden and Setchell's *Phycotheca Boreali Americana* (700 specimens), Seymour & Earle's *Economic Fungi* (500 specimens), and a private collection of American *Characeæ* (about 400 specimens). In addition, students have access to the private collection of the professor, containing about 6,000 specimens, thus giving a reference herbarium of over 12,000 specimens in nearly every department of botany. A large collection of duplicates affords abundant material for students in advanced systematic work, and the conservatory on the experimental farm will furnish fresh botanical material for use during the winter months.

The departmental library, including private works accessible, now contains about 450 volumes and as many pamphlets, comprising nearly all the important recent works on American botany and is particularly good in that relating to the Rocky Mountain region. Books needed for students doing special work, will be purchased as required.

The Zoological Laboratories occupy rooms adjacent to the botanical, and can accommodate about 28 students. The apparatus comprises eight compound microscopes, one fitted with iris diaphragm, condenser, and immersion lens for more detailed work; stage and eye-piece micrometers, an Abbe camera lucida, an automatic microtome, hæmacytometer, paraffin bath, dissecting instruments, etc.; a set of 32 wall charts and of anatomical models for illustrative purposes, a human skeleton, alcoholic material of the various groups of animals for class use and the nucleus of a collection in entomology. During the past year a small collection of alcoholic and formalin preserved specimens has been obtained for illustrative purposes.

THE GENERAL SCIENCE COURSE.

This course may be considered as representing the general educational work of the College. It is arranged so as to meet the wants of those who seek to obtain a liberal and practical education through the study of the mathematical, physical, natural and economical sciences, and Latin or the modern languages and literature. It provides a thorough training in mathematics and physics and in the natural sciences, zoology, chemistry, botany, geology; also in the study of mental, moral and political science. It includes a liberal course in history, the English language and literature. The design is that any student completing the course shall be thoroughly equipped for the duties of life and fitted to enter successfully upon any chosen career.

SCHEDULE OF

THE GENERAL SCIENCE COURSE.

(Figures in parenthesis indicate the number of the sub-course. Other figures show the number of recitations or actual hours of practice per week.)

FRESHMAN YEAR.

First Semester.

MATHEMATICS,	5:	Higher Algebra.
LANGUAGE,	6:	Latin, or German, or French, 4. Rhetoric, 2.
CHEMISTRY (1),	4:	Lectures, 3; Recitation, 1.
DOMESTIC SCIENCE,	2:	Household Economy and Sanitation, for women.
Practicums,	12 to 15:	Freehand Drawing, 3, for men. Botany (2), 6. Chemistry (3), 6. *Rhetoricals, 1.

Second Semester.

MATHEMATICS,	5:	Trigonometry.
LANGUAGE,	6:	Latin, or German, or French, 4. Rhetoric, 2.
BIOLOGY, (1)	2:	Human Physiology.
CHEMISTRY (2),	4:	Lectures, 3; Recitation, 1.
Practicums,	14 to 15:	Freehand Drawing, 4, for men. Freehand Drawing, 7, for women. Domestic Science, 4, for women. Chemistry (4), 6, for men. Biological Laboratory, 4.

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*Required of all students not members of a college literary society.

GENERAL SCIENCE COURSE.—SOPHOMORE YEAR.

First Semester.

Language,	5:	Latin, or French, 3.* American Literature, 2.
History,	3:	The Athenian Empire.
Physics (1),	3:	General Properties, Mechanics, Sound, and Heat, required of men.
Practicums,	10:	Physical Measurements, 6, required of men. Art, 4.
Elective,	5 to 26:	One, two or three of the following: Analytic Geometry and Calculus, 5. Chemistry (11), Lectures, 3, Laboratory (5), 6. Botany (3), Lectures, 2, Laboratory, 6. Domestic Science, Lectures, 2, Laboratory, 6. Art, Lectures, 2, Laboratory, 6. Shopwork, 6. Physics. Physical Measurements, 6, for women. †Rhetoricals, 1.

Second Semester.

Language,	5:	Latin, or French, 3.* Shakespeare, 2.
History,	3:	The Roman Republic.
Physics (1),	3:	Magnetism, Light, and Electricity.
Zoology (1),	2:	General Zoology.
Practicums,	10:	Physical Measurements, 6, required of men. Zoology (2), 4.
Elective,	5 to 25:	One, two or three of the following: Calculus, 5. Pedagogy, 5. Chemistry (12), Lectures, 3, Laboratory (7), 6. Botany (4), Lectures, 2, Laboratory, 6. Domestic Science, Lectures, 3, Laboratory, 6. Art, Lectures, 2, Laboratory, 6. Physical Measurements, 6, for women.

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*Required of those who have not taken German. Men who have completed freshman German must take two electives; women must choose three.

†Required of all students not members of a college literary society.

GENERAL SCIENCE COURSE—JUNIOR YEAR.

First Semester.

LANGUAGE,	2:	English Literature.
POLITICAL SCIENCE,	3:	Constitution of the United States.
SCIENCE,	3:	Astronomy.
ELECTIVE,	16 to 19:	Two of the following:
		Physics (3), Lectures, 3, Laboratory (4), 6.
		Chemistry (10), Lectures, 3, Laboratory ( ), 6.
		Botany (4), Lectures, 2, Laboratory, 6.
		Zoology (3), Lectures, 2, Laboratory, 6.
		Art, Lectures, 2, Laboratory, 6.
		History, Lectures, 3, Library, 6.
		Surveying, Lectures, 2, Field, 6.
		Domestic Science, 8.
		*Rhetoricals, 1.

Second Semester.

LANGUAGE	2:	English Literature.
ECONOMICS,	3:	Principles of Political Economy.
MENTAL SCIENCE,	3:	Elements of Logic.
ELECTIVES,	16 to 18:	Two of the following:
		Chemistry (10), Lectures, 3, Laboratory (4), 6.
		Botany (17), Lectures, 2; Laboratory, 6.
		Zoology (4 or 5), Lectures, 2, Laboratory, 6.
		Art, Lectures, 2, Laboratory, 6.
		History, Lectures, 3, Library, 6.
		Bookkeeping, 10.
		History of Philosophy, 4.
		Domestic Science, 8.

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*Required of all students not members of a college literary society.

GENERAL SCIENCE COURSE.—SENIOR YEAR.

First Semester.

Philosophy, 4: Psychology.
Political Science, 4: International Law.
Geology, 5: Dynamic and Structural Geology.
Electives, 2 to 8: One or two of the following.
Mineralogy and Crystallography, 5.
English Literature, 2.
English Composition, 2.
*Rhetoricals, 1.
Thesis.

Second Semester.

Social Science, 3: Sociology.
Moral Science, 3: Principles of Ethics.
Geology, 3: Historical Geology.
Electives, 2 to 7: One or two of the following:
Lithology, 4.
Psychology, 3.
Economic Geology, 2.
English Literature, 2.
English Composition, 2.
Thesis.

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*Required of all students not members of a college literary society.

ENGLISH.

Prof. Brewer.

1. ***Rhetoric.***—This work is a further application of the principles learned in the preparatory course. A little time is spent in the development of theory, but for the most part the course consists in actual practice in the different types of English prose composition, criticism, exposition, argumentation, description and narration. Themes are prepared frequently and read and criticised before the class. Models are set from the English masterpieces for imitation. Work poorly done is rewritten by the student, in accordance with the suggestions of the instructor. The course is intended to form a sufficient preparation for the written work required frequently in most subjects throughout the course.

2. ***American Literature.***—The first formal literary course in the College is the study of American literature, which takes two hours a week during the first semester of the the sophomore year. No text-book is used, the work being altogether lectures, with outside reading, and written and oral reports. The library is fairly well equipped with the necessary material, which is constantly being increased.

3. ***Shakespeare.***—The second semester of the sophomore year is devoted to Shakespeare, at least one play being read critically in class. All students are expected to be able to read aloud intelligently and intelligibly, and such reading is considered a part of the interpretation. Lectures and written reports may form a part of the work.

4. ***English Literature.***—In the junior year the subject of the course is some period of English literature since Shakespeare. The methods of work are the same as in the course in American literature described above. The period treated will vary from year to year to furnish an elective course for the seniors. The subject for the year 1899–1900 was the Victorian period; the subject for 1900–1901, will be the literature of the XVIIIth century.

In the senior year the work is similar in character to the work already described in the junior year. The subject of the course will be changed from year to year, and the seniors will meet with the juniors.

5. ***Advanced Composition.***—An elective in composition is offered in the senior year. This will consist in the study of the finer qualities of style through an historical review of English prose and through steady practice in composition. The work may vary somewhat to suit the special purposes of those who may elect the course.

HISTORY AND POLITICAL SCIENCE.

MISS BREWER AND PROF. BREWER.

1. ***Greek and Roman.***—The student is expected to have had a preparatory course which has given him some knowledge of the great epochs in history and their relations to each other. Therefore, in the sophomore work, he will take up the thorough study of special important periods. By the use of such sources as are available in translations of Greek and Latin authors, the student will be encouraged to form his own opinions. In this connection he will be given practice in the application of the fundamental principles used in testing the value of historical material. The work will not be confined to this line, but standard historians will be consulted on the subjects pursued.

The junior elective course for 1900–1901 will be the same work as for the sophomores.

2. ***Political Science.***—The first semester of the junior year is given to the study of Bryce's American Commonwealth. The work will proceed by recitations and may include some outside reading and reports. The aim of the course will be to give the student a clear idea of the history and present-day working of our government and the problems that confront it; and to enable him to study intelligently contemporary politics and public life.

LATIN.

Miss Brewer and Prof. Brewer.

1. ***Virgil.***—The first six books of the Aeneid are read with library work on the antiquities of the text. Metrical reading of the Latin is practiced constantly. The students are encouraged to make metrical translations and paraphrases.

2. ***Livy and Horace.***—The special aim in this year's work, as in the previous course, is to enable the student to acquire facility in reading and to instruct him in the use of Latin texts as a means of acquiring knowledge of the public and private life of the Romans; but grammatical study and literary criticism will not be neglected.

MODERN LANGUAGES.

Prof. Currier.

FRENCH.

The study of French is begun in the freshman year, and the first year's work includes thorough study of the elements of grammar, careful reading with translation of three hundred pages or more of easy French, composition, practice in pronunciation and oral reading. Fair facility in sight reading is expected at the close of the year.

In the sophomore year, in addition to easy texts, further study of grammar and composition, specimens of the classics, prose and poetry, will be read, and also some scientific French, thus cultivating in the student an appreciation of the best foreign literature. The chief aim of the course is acquisition of practical reading knowledge.

GERMAN.

The freshman work in German is a continuation of the course offered in the preparatory department and can be taken only by students who have had two years of German previously. Scientific texts will be read in addition to the classics and special attention will be paid to composition.

MATHEMATICS.

Miss Travis.

1. ***Higher Algebra.***—Beginning with a thorough review of radicals, quadratics, ratio and proportion, the course covers variation and progression, binomial theorem, convergency, divergency, and summation of series, undetermined coefficients, logarithms, permutations and combinations, and continued fractions. Text-book: Wells' College Algebra.

2. ***Trigonometry.***—A thorough course in plane trigonometry, much time being given to the solution of triangles on account of its great practical importance in further technical work. Text-book: Wells' New Plane Trigonometry.

3. ***Analytic Geometry.***—Straight lines and conic sections, and an introduction to geometry of three dimensions. Text-book: Nichols' Analytic Geometry.

4. ***Calculus.***—The work will be made as practical and concrete as possible. The integral calculus will be introduced early in the course and taught consecutively with the differential. Text-book: Hall's Calculus.

CHEMISTRY AND PHYSICS.

Dr. Traphagen and Mr. Cobleigh.

[For description of sub-courses, see Course in Chemistry.]

1, 2. ***General Chemistry.***—Lectures and laboratory work.
3. ***Qualitative Analysis.***
4. ***Blowpipe Analysis.***
5. ***Quantitative Analysis.***
7. ***Organic Chemistry.***
10. ***Chemical Analysis.***

Any sub-course in chemistry given in the chemical course may be taken for elective work, provided the student selecting such work has a sufficient preparation.

1. ***Physics.***—The lectures in physics are designed to render the student familiar with modern theories. The work is largely experimental, a fine set of physical apparatus made for us by Max Kohl of Chemnitz, Germany, making it possible to illustrate by attractive experiments many of the phenomena of this science. Atkinson's Ganot is used as a reference book.

2. ***Physical Measurements.***—This work is that outlined in Sabine's Manual of Physical Measurements and consists of a series of very carefully selected experiments in physics. It constitutes course C of Harvard University.

3. ***Physics.***—Lectures and recitations on the absolute system of mechanical and electrical units; the derivation and use of the Ampere, the Volt, the Ohm, the Joule, the Watt, the Farad, the Coulomb, and the units of electric and magnetic induction; methods of electrical and magnetic measurements used in the laboratory. Lectures two hours a week during first semester. Text-books: Everett's C. G. S. System of Units, Glazebrook and Shaw's Physics, H. C. Parker's Electrical Measurements.

4. ***Physics.***— Electrical measurements five hours per week during the first semester. Text-book: Electrical Measurements, by H. C. Parker.

ART COURSE.

Mrs. Marshall.

The Art Course, as here outlined, will indicate the work of the average student in the various departments of the college work.

This department also provides a regular four years' course for those who attend mainly for the art work.

All the teaching being individual, the student is carried forward just as rapidly as his own talent and industry will permit.

Every effort is made to teach correct drawing. The pupil is then encouraged to apply such knowledge in any direction in which his talents may seem to lie, and is allowed the use of various mediums, such as oil, water color, pastel, etc., and also can take lessons in China painting.

The classes in drawing and wood carving are open to students in any of the college courses.

All the work done must be returned for the annual art exhibition.

FRESHMAN YEAR.

Drawing from the cast, in charcoal and crayon. Still life and object drawing. Drawing from plants and other natural forms in preparation for design. Sketching from nature, during the last few weeks of the second semester.

In object drawing the pupil is required to study artistic grouping and good arrangement of light and shade. Memory and time drawing and blackboard work will be carried through the year.

Perspective, and its practical application to the drawing of buildings and to sketching from nature. Perspective problems to be worked out and carefully drawn. Water color tinting for mechanical work.

Two art lectures a week.

Clay modeling and wood-carving may be studied at the discretion of the teacher.

SOPHOMORE YEAR.

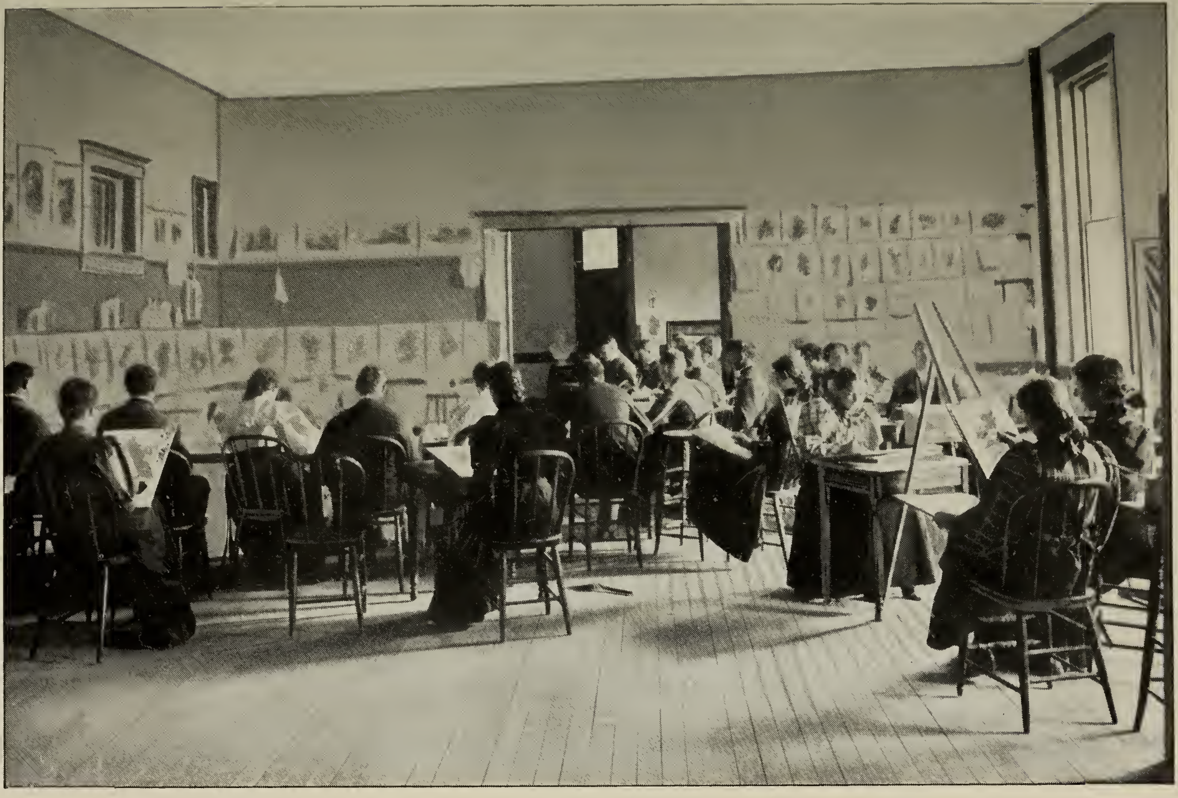
General Principles of Design.—Color schemes and color harmony. Historic ornament.

Each student will occasionally be required to submit original designs for embroidery, wood-carving and other decorative work, based upon plant forms which he has drawn during previous years.

Painting of plants and still life in oil or water color.

Pen and ink drawing.

Sketching from nature as the weather will permit.



ART ROOM

JUNIOR YEAR.

Wood-carving.—An extended course in carving as applied to furniture and other objects.

Lectures on the history of wood-carving.

Figure Study.—In this year there is a life class, open to all who show talent for figure drawing. Study of costume. Painting in oil and water color. Lectures on decoration of interiors.

SENIOR YEAR.

Any branch of art preferred by the student. Otherwise further instruction in branches already begun by the student.

China painting, if desired.

BOTANY.

DR. BLANKINSHIP.

[For detailed description see Course in Biology.]

2. ***Morphology of Cryptogams.***
3. ***Histology and Physiology.***
4. ***Advanced Systematic Botany and Ecology.***

*5. ***Bacteriology.***

*6. ***Economic Botany.***

Each subject is six hours per week during the time given.

ZOOLOGY.

PROF. COOLEY.

[For detailed description see Course in Biology.]

1. ***Human Physiology.***
2. ***General Zoology.***
3. ***Elementary Entomology.***
4. ***Advanced Entomology.***

The courses must be taken in the order given.

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*In alternate years.

GEOLOGY.

DR. TRAPHAGEN.

Lectures in connection with the use of Le Conte's Elements of Geology as a text, occupy the entire year. The work is divided into physical, structural and historical geology, and includes practice in the identification of the age of rocks by fossils, stratigraphical work in the field, and identification of the crystalline rocks by microscopical examination.

The fact that the Livingston and Three Forks folios, issued by the United States Geological Survey, cover the region immediately surrounding us, shows how favorably we are situated for field work in geology under the best conditions.

We have within a few miles of the College, not only stratified rocks covering great ranges of geological time, but we have also many of the eruptives, which have been carefully studied and described by expert geologists. The course in geology is given only in alternate years. It will not be given in 1900–1901.

Economic Geology is treated by lectures under the following general headings: Ore deposits; classification, genesis, occurrence; coals, petroleum and natural gas; building stone; abrasive materials, natural salts; gems; limes, cement and artificial stones; pigments; water; phosphates; clays used for pottery, porcelain, etc.; sands for glass; soils and miscellaneous topics.

Mineralogy.—Lectures upon mineralogy are given, and in conferences the attention of the student is directed to the characteristics of each of the minerals whose identification is required, its resemblance to other minerals and its differences. The lectures deal with all those properties which can be distinguished without apparatus, the chemical composition and tests being only incidentally treated. Later, in determinative mineralogy, unknown minerals are given, and by the application of the chemical tests of blowpipe analysis, and his knowledge of theoretical mineralogy and of crystallography, the student identifies the specimens.

The specimens used in this course consist of a large collection, illustrating the minerals of economic importance and their associates. The students also have access to the very extensive collections of the College.

Crystallography.—Crystallography is taught by aid of a set of models which illustrate the more important crystalline forms and their modifications. They cover all the forms of which a knowledge is necessary for the student of mineralogy, and the student becomes thoroughly familiar with each of them.

MENTAL AND MORAL SCIENCE.

PRES. REID.

The work in this department aims to introduce the student to an acquaintance with the nomenclature, definitions, methods, problems and aims of philosophical study. The transition by the young student from studies mainly objective, to studies chiefly reflective and subjective, is often to the average student, a difficult and unwelcome experience. Any course of preliminary instruction, therefore, calculated to smooth the way for this transition by familiarizing the student's thought with the terms, definitions, method and easier problems, must be as valuable as welcome to the student. Suitable elementary texts in logic, psychology and ethics will be chosen to perform this important office, supplemented by a course of lectures especially prepared as an introduction to a more comprehensive study of philosophy. The history of philosophy will be studied during the second semester of the junior year.

Logic.—The work in this subject will occupy the second semester of the junior year. Of the value of the study of logic, both as a mental gymnastic and as a special training of the faculties for the discovery of truth and the detection of error, nothing need be urged.

Our method of instruction includes thorough study of the text-book and a practical application of the principles of logic to the student's habits of thinking and expression, and to the detection of logical fallacies in examples chosen from standard literature.

Psychology.—The first semester of the senior year is devoted to this study. Careful attention will be given to the double aspect of this science, approaching it from the standpoints of consciousness and physiology. Class discussion and debate on the many interesting and practical questions that constantly present themselves in the pursuit of this study will be encouraged, and thesis work assigned to develop such questions more fully. The study may be carried on as an elective throughout the year.

Economics and Sociology.—The principles of political economy are taken up in the second semester of the junior year and consist of a course in general economic theory based upon Ely and Walker. The subjects of money and banking, taxation, rent, socialism and the labor problem are discussed.

The work in sociology is carried on during the second semester of the senior year. The origin and history of human society, the various social phenomena, and the laws controlling human intercourse will be treated.

The general theory of sociology is taken up and studied by means of text-book and discussions.

Ethics.—During the second semester of the senior year the study of ethics is taken up and is carried on throughout the semester. The various ethical theories are discussed, for which the student is prepared by his studies in the history of philosophy and psychology.

Astronomy.—This study occupies the first semester of the junior year, and includes the study of the celestial sphere, astronomical instruments, the solar system, eclipses, the stars, etc. The text-book is Lockyer's Astronomy.

DOMESTIC SCIENCE.

Miss Harkins.

Household Sanitation.—Lectures pertaining to the proper care of the home and its inmates.

Cooking.—The work in cooking is both theoretical and practical. The object of the work is to familiarize the student with the most systematic, economical, healthful and attractive methods of preparing and serving foods. Special attention is given to table-laying and decorations, and to serving of meals.

Students taking domestic science in the sophomore and junior years of the general science course have a choice of sewing or cooking.

OTHER SUBJECTS.

Shop Work.—The use and care of tools, exercises on the most common splices and joints, rabbeting, gaining, and plowing. Every new exercise will be preceded by lectures. The course is designed to give students such training in the use of tools as will be of most value to them in their future work. Prof. Williams.

Surveying.—The elements only of plane surveying are taught; including the use of the compass, transit, level, chain and rods; all adjustments of instruments; surveying of fields, establishing of corners, running of levels, triangulation, and computation of areas and earthwork. Class room and field work. Prof. Fortier.

Pedagogy.—The work in this subject is elective, five hours per week during the sophomore year. The work of this course includes a study of the prominent educators, and discussions of the principles advanced by them as related to the modern methods of education. Miss Cantwell.

Rhetoricals.—Exercises in public speaking under the supervision of an instructor will be required of all students not actively engaged in the work of the college literary societies. Declamations or themes will be required of the preparatory classes, and essays, orations, or a course in extemporaneous speaking and debating will constitute the work required of college students.

THE COURSE IN AGRICULTURE.

DIRECTOR EMERY, PROF. SHAW AND PROF. FORTIER.

The aim of this course is to give young men a general scientific education, to instruct them thoroughly in the relations of science to the various branches of agriculture, and to supply the mental training necessary to successful investigators or practical agriculturists.

The student is taught the application of the principal branches of physical and natural science to the business of farming, and is afforded a thorough knowledge of its principles and practices. Instruction is given in regard to the nature of soils, the reason for, and the best methods of cultivation; the application of water to growing vegetation, and the action of irrigation waters upon the soil and crop; the constituents and characteristics of plants and animals, and the conditions necessary for their perfect development.

The student's time is not consumed in manual labor, except where special skill is required in the performance of some particular work. His time is fully occupied in the instruction in class room, laboratory, field and shop. No pains are spared to give a high degree of intellectual training and special preparation for the business of farming.

The general studies of the course include mathematics, English, history, literature, and the principles of the general sciences. The direct application of these sciences is brought out early in the course, and as the student advances in mental training he is given more difficult work. During the senior year he is assigned subjects for original investigation. For a description of general studies see the general science course.

SCHEDULE OF

AGRICULTURAL COURSE.

FRESHMAN YEAR.

The same as in the general science course.

(Figures in parenthesis indicate the number of the sub-course. Other figures show the number of recitations or actual hours of practice per week.)

SOPHOMORE YEAR.

First Semester.

Language,	5:	Latin, or French, 3.*
		American Literature, 2.
History,	3:	The Athenian Empire.
Chemistry (12),	3:	Lectures.
Agriculture,	3:	Soils, Crops, and Fertilizers.
Practicum,	6:	Chemical Laboratory (9).
Electives,	8 or 9:	One of the following:
		Physics (1), Lectures, 3, Physical Measurements, 6.
		Botany (2), Lectures, 2, Laboratory, 6.
		†Rhetoricals, 1.

Second Semester.

Language,	5:	Latin, or French, 3.*
		Shakespeare, 2.
History,	3:	The Roman Republic.
Chemistry (14),	3:	Lectures.
Agriculture,	3:	Soils, Crops, and Fertilizers.
Practicum,	6:	Chemical Laboratory (10).
Electives,	8 or 9:	One of the following:
		Physics (1), Lectures, 3. Physical Measurements, 6.
		General Zoology (1), Lectures, 2, Laboratory, 6.

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*Required of those who have not taken German. Those who have completed freshman German must take two electives.

†Required of all students not members of a college literary society.

AGRICULTURAL COURSE—JUNIOR YEAR.

First Semester.

Language,	2:	English Literature.
Political Science,	3:	Constitution of the United States.
Science,	3:	Astronomy.
Surveying,	2:	Lectures.
Agriculture.	6:	Breeds and Breeding, 4. Veterinary Anatomy, 2.
Practicum,	6:	Fieldwork in Surveying.
Electives,	8 or 9:	One of the following: Chemistry (15), Lectures, 3, Laboratory, 6. Botany (4), Lectures, 2, Laboratory, 6. Zoology (3), Lectures, 2, Laboratory, 6. *Rhetoricals, 1.

Second Semester.

Language	2:	English Literature.
Economics,	3:	Principles of Political Economy.
Agriculture,	5:	Feeds and Feeding, 3. Veterinary Medicine, 2.
Practicum,	10:	Bookkeeping.
Electives,	16 or 17:	Two of the following: Chemistry (15), Lectures, 3, Laboratory, 6. Botany (4), Lectures, 2; Laboratory, 6. Zoology (4 or 5), Lectures, 2, Laboratory, 6.

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*Required of all students not members of a college literary society.

AGRICULTURAL COURSE.—SENIOR YEAR.

First Semester.

Philosophy,	4:	Psychology.
Political Science,	4:	International Law.
Geology,	5:	Dynamic and Structural.
Mechanics,	2:	Practical Steam Engineering.
Agriculture,	3:	Irrigation.
*Rhetoricals,	1:	
Practicum,	3:	Engineering Laboratory.
Thesis.		

Second Semester.

Social Science,	3:	Sociology.
Moral Science,	3:	Principles of Ethics.
Geology,	3:	Historical Geology.
Agriculture,	19:	Dairying, Lectures, 3, Laboratory, 9, History of Agriculture, 3. Animal Nutrition and Diseases of Animals, 4.
Thesis.		

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*Required of all students not members of a college literary society.

DESCRIPTION OF SUB-COURSES.

Soils, Crops and Fertilizers.—Kinds of soils, their source, physical properties, cultivation. History of our common crops, their development, production, use, characteristics. Action of fertilizers; potash, nitrogen and phosphorus; their adaptability to general and special crops; green manuring, artificial manures, maintenance of fertility of soils.

Dairy Husbandry.—Adaptability to certain sections; small dairies and creameries; testing of milk; butter and cheese making; breeds of dairy animals; rearing, feeding and management. Both lectures and practical work.

Breeds and Breeding.—Different breeds of live stock, their source, breeding and development; pedigrees, their value and manner of keeping; principles of stock breeding, atavism, heredity, selection, control of sex, inbreeding, linebreeding, crossing, parental and climatic influences; care and management of breeding animals.

Feeding of Animals.—Constituents of foods, and of the animal body, their relation to each other; digestion, assimilation and waste; feeding stuffs, varieties, preparation, by-products, composition, digestibility, nutritive ratios; harvesting of fodders, hay making, ensilage, roots; soaking and grinding of food; feeding for special purposes, calculation of ratios; feeding standards, maintenance ration; feeding for beef, mutton, pork; feeding the working animal; feeding for milk and butter; for muscle power; effects of breeds; individuality of animals; influence of various foods.

Irrigation.—This subject is of special importance and great value in the Rocky Mountain regions, where successful agriculture depends upon the application of water to crops by artificial means.

The object is to give students a thorough knowledge of the irrigation laws of Montana, construction and maintenance of ditches, headgates, measuring devices, miner's inch and cubic foot systems of measurement; action of water on soils and crops; irrigation appliances and devices;

measurement, division and duty of water; method of application to various soils, drainage, seepage from ditches; amount of water returning to rivers which may be again used in irrigation; formation of ditch companies and their methods of management.

Surveying.—The same as in the general science course.

VETERINARY SCIENCE.

1. ***Veterinary Anatomy.***—Both special and comparative anatomy of the domestic animals. Laboratory work will consist of dissections of the various domesticated animals.

2. ***Veterinary Medicines.***—Nature, uses, effects, doses, and applications of the various drugs used in veterinary practice. General preventive measures and animal sanitation. Care and use of domestic animals.

3. ***Animal Nutrition.***—Value, uses and effects of the common fodder plants. Comparative animal physiology. Functions of the various organs in the digestion of foods. Assimilation and excretion.

4. ***Diseases of Animals.***—Special, general and contagious diseases of animals. Pathological physiology and anatomy of organs. Diagnosis, surgical and medical treatment of diseases.

Agricultural Chemistry and Physics.—Lectures upon the origin, composition and physical properties of soils and the conservation of plant food and moisture. The composition of animal and vegetable tissues and principles of nutrition. Manufacture and use of fertilizers, etc.

Chemistry.—The course in chemistry contains a description of the work in general chemistry, laboratory work and organic chemistry.

Shop Work.—CARPENTRY, FORGE WORK.—The same as in the mechanical engineering course.

Practical Steam Engineering.—A brief course in the theory, design and management of steam engines and boilers. The time will be largely devoted to the slide valve engine and the locomotive type of boiler. The class room work will be supplemented by work in the mechanical laboratory, and will give especial attention to valve setting, the management and care of boilers, pumps, injectors and auxiliary apparatus. For the practical work, the threshing engine and the 15 H-P. vertical engine in the engineering laboratory will be used.

Horticulture.—General scheme: Selection and preparation of site for orchard and small fruits, propagation of trees and plants, comprising production of fruit stocks, grafting, budding, layering, etc.; planting, cultivating, pruning, winter protection, irrigation, harvesting, storing and marketing fruit. The treatment of trees and plants for fungous diseases and parasites.

Landscape Gardening.—Will embrace landscape and kitchen gardening by lectures, also by illustrations drawn from object lessons upon the experiment station and College grounds, of trees, plants and flowering shrubs, the method of propagating these, general arrangement, planting and culture, also practical instruction in vegetable and window gardening.

Upon the grounds of the experiment station, in connection with the College, is a small but practical nursery; also an orchard in which are propagated and cultivated the various small orchard fruits, deciduous and evergreen trees, vines, etc. The greenhouses and conservatory afford excellent opportunity to acquire a good working knowledge of the science of horticulture, than which there is no agricultural science of more value to mankind.

Botany and Zoology.—For the general courses in these subjects, see course in biology.

COURSE IN BIOLOGY.

It is the purpose of the biological course here outlined, not only to afford a liberal education in general science and literature, but also to give the student special training in botany and zoology, so that graduates from these departments may be fitted for positions as teachers and specialists in the subjects selected, and also be prepared by an extensive course in the classics and modern languages to take advanced standing for special graduate work in the eastern universities.

The situation of the College is unexcelled for the study of natural history. In the immediate vicinity of mountains, valleys and plains, whose fauna and flora are but imperfectly known, whose biological regions are wholly undetermined, and whose economic possibilities are yet to be ascertained, the student has an ideal opportunity for independent investigation into the life-history, habits, adaptations and uses of the plants and animals around him. The chief aim of the teacher will be to inspire the student with a love of Nature and to give him the best modern appliances for biological investigation. The philosophical feature of science will always be kept in view and the student will be taught to see and think for himself.

While in general the outline of sub-courses hereafter given will be followed closely, the largest latitude possible with unity of work will be permitted in the choice of electives, and special students will always be encouraged.

At the beginning of the junior year the student should elect either botany or zoology as a major to be continued till graduation, and electives may be substituted for any or all subjects of the other department for the rest of the course.

SCHEDULE OF

COURSE IN BIOLOGY.

FRESHMAN YEAR.

The same as in the general science course.

(Figures indicate the number of recitations or the actual hours of practice per week; those in parenthesis the number of the sub-course.)

SOPHOMORE YEAR.

First Semester.

LANGUAGE,	5:	Latin, or French, 3.
		American Literature, 2.
HISTORY,	3:	The Athenian Empire.
BOTANY (3),	6:	Histology and Physiology.
ELECTIVES,		Two of the following:
		Analytical Geometry and Calculus, 5.
		Chemistry (12), Lectures, 3, Laboratory, 6.
		Domestic Science, Lectures, 2, Laboratory, 6.
		Art, Lectures, 2, Laboratory, 6.
		Shopwork, 6.
		Physics (1), Lectures, 3, Laboratory, 6.
		*Rhetoricals, 1.

Second Semester.

LANGUAGE,	5:	Latin, or French, 3.
		Shakespeare, 2.
HISTORY,	3:	The Roman Republic.
ZOOLOGY (1),	2:	General Zoology.
ELECTIVES,		Two of the following:
		Calculus, 5.
		Pedagogy, 5.
		Chemistry (14), Lectures, 3, Laboratory, 6.
		Physics (1), Lectures, 3, Laboratory 6.
		Domestic Science, Lectures, 2, Laboratory, 6.
		Art, Lectures, 2, Laboratory, 6.

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*Required of all students not members of a college literary society.

COURSE IN BIOLOGY.—JUNIOR YEAR.

First Semester.

Language,	2:	English Literature.
History,	3:	Constitution of the United States.
Science,	3:	Astronomy.
*Zoology (3),	6:	Elementary Entomology.
*Botany, (4),	8:	Advanced Systematic Botany and Ecology.
Electives,		One or two of the following:
		Art, Lectures, 2, Laboratory, 6.
		History, Lectures, 3, Library, 4.
		Surveying, Lectures, 2, Fieldwork, 6.
		Domestic Science, 8.
		Physics (3), Lectures, 3, Laboratory, 6.
		Chemistry (15), Lectures, 3, Laboratory 6.
		†Rhetoricals, 1.

Second Semester.

Language,	2:	English Literature.
Economics,	3:	Political Economy.
Mental Science,	3:	Logic.
*Botany, (4),	8:	Advanced Systematic Botany and Ecology.
*Zoology (4 or 5),	6:	Advanced Entomology or Advanced Zoology.
Electives,		One or two of the following:
		Domestic Science, 8.
		History of Philosophy, 4.
		History, Lectures, 3, Library, 4.
		Art, Lectures, 2, Laboratory, 6.
		Chemistry (15), Lectures, 3, Laboratory, 4.
		Physics (3), Lectures, 3, Laboratory, 6.
		Bacteriology or Economic Botany, 6, for 9 weeks.

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*Students may select an elective instead of one of these.

†Required of all students not members of a college literary society.

COURSE IN BIOLOGY.—SENIOR YEAR.

First Semester.

PHILOSOPHY,	4:	Psychology.
POLITICAL SCIENCE,	4:	International Law.
GEOLOGY,	5:	Dynamic and Structural.
*RHETORICALS,	1:	
THESIS,	12:	Original Investigation.

Second Semester.

SOCIAL SCIENCE,	3:	Sociology.
MORAL SCIENCE,	3:	Ethics.
GEOLOGY,	3:	Historical.
THESIS,	15:	Original Investigation,

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*Required of all students not members of a college literary society.

ZOOLOGICAL LABORATORY

BOTANY.

DR. BLANKINSHIP.

2. ***Morphology of Cryptogams;*** laboratory culture of fungi; use of the compound microscope; staining and mounting of specimens; drawing throughout. Six hours per week, first semester, freshman year.

REFERENCES: Bessey's Botany, Goebel's Outlines of Classification, Bennett & Murray's Cryptogamic Botany.

3. ***Histology.***—A study of the cell, the tissues, and the nascent organs of plants; staining and mounting of sections; microchemistry and microtechnique.

REFERENCES: Strasburger's Manual of Vegetable Histology, Goodale's Physiological Botany, Zimmermann's Botanical Microtechnique, Poulson's Botanical Microchemistry.

Physiology.—A study of the functions of the living plant organs; the phenomena of assimilation, growth, transpiration, movement, reproduction, etc. Lectures, 2, laboratory and field work, 4 hours per week during the first semester, sophomore year.

REFERENCES: The text-books on physiological botany, Goodale, Vines, and Darwin & Acton.

4. ***Systematic Botany;*** continuing the work of (1) and (2). In a study of the local flora the student will be made familiar with the principal orders and genera of the flowering plants, and will learn the practical details of preparing an herbarium. Dried specimens will be used for the most part, and students who intend to take this work should previously make a collection for study during the course. The construction and use of card indexes will be taught in connection with the work. Lectures, 2, laboratory and field work, 6 hours per week during the junior year.

REFERENCES: Gray's and Coulter's Manuals, Britton and Brown's Illustrated Flora, Gray's Synoptical Flora, Brewer and Watson's Botany of California, and the various recent monographs of the principal groups.

The following additional courses are offered to students properly qualified:

(*a*) ***The Native Grasses of Montana.***

(*b*) ***The Shrubs and Forest Trees of Montana.***

(*c*) ***A Study of the Parasitic Fungi of Montana.***

Ecology.—A study of the adaptation of plants to their environment, their habitat and climatic groups, and the laws controlling their development and distribution; field work in determining these plant formations in the vicinity of Bozeman, and a laboratory study of their histological and morphological characteristics, Lectures, 2, laboratory, 6 hours per week, second semester, junior year.

REFERENCES: Warmin's Lehrbuch der œkologischen Pflanzengeographie, Drude's Pflanzengeographie von Deutschland, Constantin's Les vegetaux et les milieux cosmiques, Kerner's Natural History of Plants, Henslow's Origin of Plant Structures, Mueller's Fertilization of Flowers.

5. ***Bacteriology.***—A general study of the bacteria of fermentation, decomposition and disease, their life-history and classification; cultivation in nutrient media; sterilization; pure-cultures; determination of bacteria in water, milk. air, etc.; staining and mounting. Lectures, 2, and laboratory, 4 hours per week for 9 weeks of the second semester, junior year.

REFERENCES: Manuals of Schrenk, De Bary, Sternberg, and Pearmain & Moore.

This course (5) will be given in 1900–1901, and alternates with the following:

6. ***Economic Botany.***—The plants used for food, shelter, medicine, etc.; weeds, forage plants, food adulteration, vegetable pathology.

REFERENCES: Smith's Diseases of Field and Garden Crops, Tubeuf and Smith's Diseases of Plants Induced by Cryptogamic Parasites, Flint's Grasses and Forage Plants, De Candolle's Origin of Cultivated Plants, and the various publications of the department of agriculture.

7. ***Research Work*** for thesis in some department of botany selected by the student, and a summation of his work in a final paper. The hours will be arranged to suit the convenience of the student, but a portion of the work can usually be best done during the summer preceding the year of graduation.

ZOOLOGY.

PROF. COOLEY.

1. ***Human Anatomy and Physiology.***—Lectures on the anatomy and physiology of the human body, supplemented by laboratory work. The course is designed to be foundational to the study of zoology,

2. ***General Structural and Developmental Zoology.***—The study of a series of representative animals conducted by lectures and laboratory work. The homology and analogy of the organs in different animals will be emphasized.

3. ***Entomology.***—External anatomy, metamorphosis, habits and classification of insects. Collecting and preserving insects. Economic entomology. The laboratory work consists of a study of the external anatomy of a member of each order of insects.

4. ***Advanced Entomology.***—Determining insects in each order. Literature of insects. Special anatomy. Habits of insects. Means of defense and attack in insects. Parasitism in insects. Insect depredations. Insecticides and insecticide appliances. Other means of control of injurious insects.

5. ***Advanced Zoology.***—The following subjects will be covered in lectures and laboratory work: History of zoology. Systematic zoology. General embryology. Animal histology. Data of evolution.

6. ***Thesis Work*** in the senior year will be upon some line of original research.

THE COURSE IN

ANALYTICAL AND APPLIED CHEMISTRY.

DR. TRAPHAGEN AND MR. COBLEIGH.

The purpose of the course in chemistry is to make educated chemists—men who are not only qualified to make correct analyses of what may be handed them, but who have also had, with their technical training, a good, liberal education. The possibilities of the successful application of chemical knowledge to the solution of the problems of daily life on the farm, in the smelter, in the dye works, in the sugar refinery, in the gas works, in nearly all manufactures and the arts, are too well appreciated to need any argument.

The range of chemical knowledge is too wide today to be covered by any one man, therefore it will be wise, when the student of the chemical course has covered the required work, for him to select some definite line which he may decide to make his specialty. This is quite possible, as each student does the greater part of his work, not in the class room, but individually in the laboratory and library.

A description of the work in chemistry follows. For information concerning other studies taught in this course see remarks under general science course.

SCHEDULE OF

COURSE IN CHEMISTRY.

(Figures indicate the number of recitations or the actual hours of practice per week. Figures in parenthesis indicate the number of the sub-course.)

FRESHMAN YEAR.

First Semester.

CHEMISTRY (1),	4:	Lectures on the Non-metals, 3; Recitation, 1.
MATHEMATICS,	5:	Higher Algebra.
LANGUAGE,	6:	German or French, 4. Rhetoric, 2.
Practicums,	19:	Chemistry (2), 6. Shop Work (1), 6. Mechanical Drawing, 7. *Rhetoricals, 1.

Second Semester.

CHEMISTRY (2),	4:	Lectures on the Metals, 3. Recitation, 1.
MATHEMATICS,	5:	Trigonometry.
LANGUAGE,	6:	German or French, 4. Rhetoric, 2.
BIOLOGY, (1)	2:	Human Physiology.
Practicums,	15:	Chemistry (4), 9; Biological Laboratory, 4.

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*Required of all students not members of a college literary society.

COURSE IN CHEMISTRY.—SOPHOMORE YEAR.

First Semester.

CHEMISTRY (5 and 7),	5:	Metallurgy, 3;
		Physical Chemistry, 2.
PHYSICS (1),	3:	General Properties, Mechanics, Sound, and Heat.
LANGUAGE,	5:	French, 3.
		American Literature, 2.
HISTORY,	3:	Athenian Empire.
Practicums,	15:	Quantitative Analysis (9), 8;
		Physical Chemistry (7), 2;
		Physical Measurements (2), 5.
		*Rhetoricals, 1.
SEMINARY,	1:	Journal Meetings.

Second Semester.

CHEMISTRY (6 & 7),	5:	Metallurgy, 3;
		Physical Chemistry, 2.
PHYSICS (1),	3:	Magnetism, Light, and Electricity.
LANGUAGE,	6:	French, 3.
		Shakespeare, 2.
HISTORY,	3:	The Roman Republic.
Practicums,	15:	Quantitative Analysis (10), 6;
		Inorganic Preparations (11), 4;
		Physical Chemistry (8), 2;
		Physical Measurements (2), 3.
SEMINARY,	1:	Journal Meetings.

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*Required of all students not members of a college literary society.

COURSE IN CHEMISTRY.–JUNIOR YEAR.

First Semester.

CHEMISTRY,	8:	Applied Chemistry (12), 3: Organic Chemistry (15), 3; Physical Chemistry (17), 2.
LANGUAGE,	2:	English Literature, 2.
HISTORY,	3:	Constitution of the United States.
SCIENCE,	3:	Astronomy.
Practicums,	15:	Quantitative Analysis (10), 9. Organic Chemistry (19), 6. *Rhetoricals, 1.
SEMINARY,	1:	Journal Meetings.

Second Semester.

CHEMISTRY,	8:	Applied Chemistry (13), 3; Organic Chemistry (15), 3; Physical Chemistry (17), 2.
LANGUAGE,	2:	English Literature, 2.
ECONOMICS,	3:	Principles of Political Economy.
MENTAL SCIENCE,	3:	Elements of Logic.
Practicums,	15:	Quantitative Analysis (19), 9; Organic Chemistry (16), 6.
SEMINARY,	1:	Journal Meetings.

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*Required of all students not members of a college literary society.

COURSE IN CHEMISTRY.—SENIOR YEAR.

First Semester.

Chemistry,	3:	Applied Chemistry (14), 3.
Geology,	5:	Dynamic and Structural Geology, 5.
Political Science,	4:	International Law.
Language,	2:	English Composition.
Practicums,	15:	Assaying (20), 9; Mineralogy (6), 6. *Rhetoricals, 1.
Seminary,	2:	Journal Meetings, 1; Conferences, 1.

Second Semester.

Geology,	5:	Historical Geology, 3; Economic Geology, 2.
Moral Science,	3:	Principles of Ethics.
Language,	2:	English Composition.
Thesis.		

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*Required of all students not members of a college literary society.

QUANTITATIVE LABORATORY

EXPERIMENT STATION LABORATORY

DESCRIPTION OF SUB-COURSES.

1. **General Chemistry. Non-metals.**—Lectures on the general principles of chemistry, with frequent recitations. The properties, preparation and applications of the elements and their principal compounds are here studied, and many problems involving quantitative relationships are solved. Textbook: Remsen's Chemistry. Freshman year, first semester.

2. **General Chemistry. Metals.**—A continuation of the foregoing subject with special reference to the principles underlying modern metallurgy, involving brief descriptions of the manner of securing the metals from their ores, and the effects of the more common impurities. A study of the important salts is also taken up.

During the latter part of the semester a rapid survey of organic chemistry is made, to acquaint the student with the important groups of organic compounds and to give him some idea of the methods of this branch of chemistry. Freshman year, second semester.

3. **Practical Chemistry.**—Accompanying the above lecture courses is this laboratory course, designed, by actual manipulation of the substances discussed in the class room, to render the student familiar with their preparation and properties. Freshman year, first semester.

4. **Qualitative Analysis.**—A study of the reactions of the various metals and acids, of the methods used for their identification and separation.

Simple salts of known composition are first used, and later, after the characteristic reactions are learned, simple salts and complex mixtures the composition of which is unknown to the student are given him for study.

5. **Metallurgy, 1.**—The principles of metallurgical practice; fuels; refractory materials; and iron and steel.

6. **Metallurgy, 2.**—The metallurgy of gold, including placer mining, amalgamation, chlorination and the cyanide process; silver, treatment of free milling and base ores,

direct amalgamation, chloridizing roasting followed by amalgamation, Russell process and other lixiviation methods, parting gold and silver, Parke's process and other methods for lead desilverization; copper, treatment of the various kinds of ore, bessemerization, electrolytic refining, calculation of charges, and other important subjects.

7. ***Physical Chemistry, I.***—A series of lectures and recitations on this important branch of chemistry, in which the bearing of modern principles upon operations in the laboratory, and on the larger scale in chemical manufacturing, is brought out. A general survey of the subject with the especial object of showing the practical application of later chemical theories.

8. ***Laboratory Work in Physical Chemistry.***—Practice in vapor density determinations and in the conductivity, freezing point, boiling point and other methods, applied to the determination of molecular weights.

9. ***Quantitative Analysis, I.***—This work begins with a study of the balance, its sensitiveness and accuracy, of the weights and measures used to determine their mutual relationships and for the construction of tables of corrections to be used in future analytical work. Simple salts of known composition are first analyzed, and as the student gains in skill, he passes to substances of increasing complexity and of percentage composition unknown to him. His results must come within a small fraction of one per cent of the instructor's figures on the same sample before they are accepted.

10. ***Quantitative Analysis, 2.***—An extension of the preceding course. Among other substances analyzed are the following: Bronze, arsenic ore, zinc ore, nickel ore, water, illuminating gas, fuel, bleaching powder, and steel.

11. ***Inorganic Chemical Preparations.***—The preparation of chemically pure laboratory reagents and other compounds; including qualitative and quantitative tests of the purity of the products. Manual: Vulte and Neustadt's Inorganic Chemical Preparations. One lecture, one recitation, and laboratory work.

12. ***Applied Chemistry, 1.***—Lectures and recitations on acids, alkalies, salts, limes, mortars, cements, explosives, building stones, and timber and its preservation. Thorpe's Outlines of Industrial Chemistry.

13. ***Metallurgy, 3.***—Metals of commercial importance not considered elsewhere, including aluminum, nickel, tin, zinc, antimony, and many of the less common ones.

14. ***Applied Chemistry, 2.***—The subjects studied are air, water, drink, food, cooking, and others of general interest. This course has been developed largely because of the needs of the students of domestic science, and the lectures bear upon the relationship of chemistry to our everyday life.

15. ***Organic Chemistry.***—This work consists of lectures and recitations upon the philosophy of organic chemistry, the relationships existing between the different groups, the principles underlying the construction of graphic formulæ, and the methods of preparing organic compounds.

16. ***Organic Chemistry. Laboratory Work.***—A number of organic compounds of gradually increasing complexity will be prepared and methods for the determination of the ultimate composition will be experimentally studied. The more common organic radicals will also be determined.

17. ***Physical Chemistry.***—A course of lectures on theoretical chemistry in which the recent advances in chemical theory are carefully brought out and fully discussed. A survey of the history of chemistry will be made here and especial attention will be given to the successive steps made in the development of this science.

18. ***Quantitative Analysis, 3.***—The work of this semester is devoted to a study of special methods and to a comparison of different methods with reference to accuracy of results and time required in obtaining them. Volumetric and electrolytic methods will be compared with ordinary gravimetric methods.

19. ***Quantitative Analysis, 4.***—Proximate organic analysis. Methods for analysis of organic compounds, such as

grains, grasses, plants, milk, butter, oils, foods, paints, asphalt, petroleum and flour.

20. ***Assaying.***—The situation of our College makes a thorough course in assaying one of the most important needs, and to meet it we have secured a set of samples and apparatus, and have outlined a course of work which will fully meet the requirements. We shall be able to reproduce all the conditions of the mill or commercial assay office, and to give a thoroughly practical course. Before completing the course the student is given a practical series of samples, representing the daily work of the assayer of a mill or smelter, and will be required to return accurate results within the time usually occupied by the commercial assayer. The importance of this latter fact is generally lost sight of in laboratories of instruction; with us close attention is paid to imparting an ability to handle a large amount of work in a short time, and accuracy is at the same time required. We realize the importance of both, and as a consequence our graduates are not compelled, upon going into commercial work, to meet conditions unfamiliar to them. Many methods, such for instance as the fire assay of iron ore, are rarely used; this being the case, we feel it to be a waste of the student's time to give him such work, but rather occupy him in the more common practice, and the testing of many samples at a time. The laboratory is so equipped and arranged as to make this plan possible.

21. ***Journal Meetings. Abstracting.***—In order to develop in the student a habit of careful reading, each student will be required to make abstracts of articles on assigned subjects from the leading journals, and present them at weekly meetings of students and department instructors, where the topics are freely discussed. They are thus kept in touch with the progress of the science.

22. ***Conferences.***—Regular meetings for the discussion of the progress of the work of the various students in the laboratory. In this way students and instructors are made

acquainted with each other's work, and the student is encouraged to greater effort.

23. ***Photography.***—At some time during the course an opportunity will be afforded students for the study of the general principles of photography, with practice in exposing, developing, fixing, printing and toning. Various developers will be used and comparisons made of different plates and papers. A very successful camera club existing under the auspices of the College is a great aid in creating interest in this art among the students.

24. ***Thesis.***—In the early part of the senior year the student selects the subject for his graduating thesis. The work done must include a considerable amount of original research.

HOME SCIENCE COURSE.

The course in home science provides systematic schemes for study in those branches which are directly related to healthful living, appropriate clothing, and household decoration. The object of the course is to produce good homemakers. Based upon the general science course, it provides a liberal course in domestic science.

The descriptions of the general courses will be found under the general science course. The special studies are:

Sewing.—All the ordinary forms of sewing are taught, including garment making, dressmaking and embroidery. The work is carefully graded according to the capabilities of the student, and may be utilized by her in the making of her own clothing. A straight-line system of cutting and fitting is taught, and systems are furnished at cost.

Household Economy.—Lectures embracing such subjects as food stuffs and their nutritive value, marketing, neatness and order in housekeeping, preparation and serving of foods, food for the well, food for the sick, and talks on etiquette.

Household Sanitation.—Lectures pertaining to the proper care of the home and its inmates.

Hygiene and Emergencies.—Lectures treating of the laws of health and home nursing.

Cooking.—The object of the work in cooking is to familiarize the student with the most economical, healthful and attractive methods of preparing and serving foods. Special attention is given to hygienic cookery.

The economic value of the Aladdin oven is demonstrated, and a short course is given with the chafing dish. Special attention is paid to table laying and decoration, and to serving meals.

SCHEDULE OF

HOME SCIENCE COURSE.

FRESHMAN YEAR.

First Semester.

MATHEMATICS,	5:	Higher Algebra.
LANGUAGE,	6:	Latin, or German, or French, 4.
		Rhetoric, 2.
CHEMISTRY (1),	4:	Lectures, 3; Recitation, 1.
DOMESTIC SCIENCE,	2:	Household Economy and Sanitation.
Practicums,	12 to 13:	Freehand Drawing, 3, for men.
		Botany (1), 6.
		Chemistry (2), 6.
		*Rhetoricals, 1.

Second Semester.

MATHEMATICS,	5:	Trigonometry.
LANGUAGE,	6:	Latin, or German, or French, 4.
		Rhetoric, 2.
BIOLOGY,	2:	Human Physiology.
CHEMISTRY (1),	4:	Lectures, 3; Recitation, 1.
Practicums,	17:	Domestic Science, 4.
		Chemistry (3), 6.
		Biological Laboratory, 4.

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*Required of all students not members of a college literary society.

HOME SCIENCE COURSE.—SOPHOMORE YEAR.

First Semester.

LANGUAGE,	5:	Latin, or French, 3.*
		American Literature, 2.
HISTORY,	3:	The Athenian Empire.
PHYSICS, (1),	3:	General Properties, Mechanics and Heat.
DOMESTIC SCIENCE,	2:	Lectures.
ART,	2:	Lectures.
Practicums,	16:	Domestic Science, 6.
		Art, 10.
ELECTIVES,*	5 to 10:	One of the following:
		Analytic Geometry and Calculus, 5.
		Chemistry (15), Lectures, 3, Laboratory (5), 6.
		Botany (2), Lectures, 2, Laboratory, 6.
		Physical Measurements, 6.
		†Rhetoricals, 1.

Second Semester.

LANGUAGE,	5:	Latin, or French, 3.*
		Shakespeare, 2.
HISTORY,	3:	The Roman Republic.
PHYSICS (1),	3:	Sound, Light, Magnetism, and Electricity.
ZOOLOGY (1),	2:	General Zoology.
Practicums,	16:	Domestic Science, 6.
		Zoology (1), 4.
		Art, 6.
ELECTIVES,	5 to 14:	One of the following:
		Calculus, 5.
		Pedagogy, 5.
		Chemistry (12), Lectures, 3, Laboratory, (7), 6.
		Domestic Science, Lectures, 3, Laboratory, 6.
		Physical Measurements, 6.

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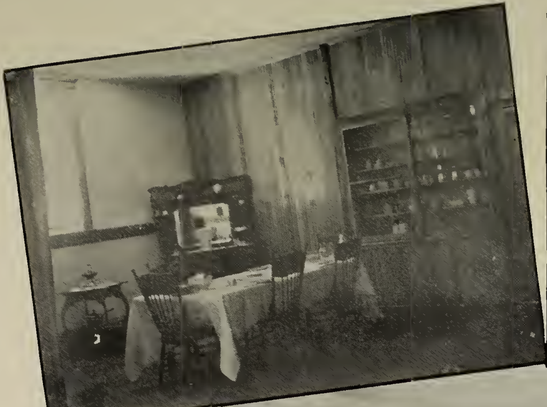
*Latin or French is required of those who have not taken German. Those who have taken German may choose one from the group of electives.

†Required of all students not members of a college literary society.



Dining Room

Kitchen

Sewing Room

HOME SCIENCE COURSE.—JUNIOR YEAR.

First Semester.

Language,	2:	English Literature.
History,	3:	Constitution of the United States.
Science,	11:	Astronomy, 3.
		Domestic Science, 8.
Electives,	8 to 10:	One of the following:
		Chemistry (10), Lectures, 3, Laboratory, (7), 6.
		Botany (6), Lectures, 2; Laboratory, 6.
		Zoology (3), Lectures, 2, Laboratory, 6.
		Art, 8.
		*Rhetoricals, 1.

Second Semester.

Language	2:	English Literature.
Economics,	3:	Principles of Political Economy.
Mental Science,	3:	Elements of Logic.
Domestic Science,	2:	Lectures.
Electives,	16 to 18:	Two of the following, including one course either in chemistry or biology.
		Chemistry (10), Lectures, 3, Laboratory (4), 6.
		Botany (17), Lectures, 2, Laboratory, 6.
		Zoology (3), Lectures, 2, Laboratory, 6.
		Art, Lectures, 2, Laboratory, 6.
		Domestic Science, 8.

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*Required of all students not members of a college literary society.

DOMESTIC SCIENCE COURSE.—SENIOR YEAR.

First Semester.

PHILOSOPHY, 4: Psychology.
POLITICAL SCIENCE, 4: International Law.
GEOLOGY, 5: Dynamic and Structural.
SCIENCE, 8: Domestic Science.
ELECTIVES, 2 to 8: One of the following.
Mineralogy and Crystallography, 5.
English Literature, 2.
English Composition, 2.
Art, 5.
*Rhetoricals, 1.

THESIS.

Second Semester.

SOCIAL SCIENCE, 3: Sociology.
MORAL SCIENCE, 3: Principles of Ethics.
GEOLOGY, 3: Historical Geology.
DOMESTIC SCIENCE, 8: Sewing.
ELECTIVES, 2 to 11: One of the following:
Lithology, 4.
Psychology, 3.
Economic Geology, 2.
English Literature, 2.
English Composition, 2.
Art, 4.

THESIS.

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*Required of all students not members of a college literary society.

SHORT COURSE IN HOME SCIENCE.

This course is intended for students who wish systematic work in domestic science and who cannot take the regular college course in domestic science. Students passing a satisfactory examination will be given a certificate.

FIRST SEMESTER.	SECOND SEMESTER.
Lectures on Household Economy,3.	Lectures on Sanitation and Nursing, 2.
Household Accounts, 1.	Cooking, 4.
Cooking, 8.	Art, 8.
Art, 4.	Sewing, 10.
Sewing, 10.	Elective: Laundry work, 2 hours for 6 weeks.
	Dairying.

Two themes must be handed in each week on some subject pertaining to domestic science or art.

Sewing.—During the first semester at least five well-made garments must be completed. During the second semester a lined and an unlined dress must be completed. Embroidery will also be taught this semester.. The Darling system of cutting and fitting will be taught.

The work in cooking and lectures have been described in the home science course.

ENGINEERING DEPARTMENT.

PROF. WILLIAMS,
PROF. FORTIER,
ASST. PROF. MCCORMICK.

The Engineering department is organized in the belief that thorough-going fundamental training is the first essential for a successful engineer, but that this fundamental training may be best secured in connection with a certain amount of study of the practical application of the principles involved, and not solely by theoretical study. It is further a leading thought that after the fundamental principles have been mastered, a certain measure of specialization in the main lines of engineering is advisable. It is the endeavor of this institution to combine a prudent amount of specialization in the closing years with a thorough grounding in the fundamentals in the earlier portion of its courses; and in carrying out this plan it endeavors to make the mathematical and theoretical courses strong in the earlier years, and the applied courses strong in the later years, while the drafting and shop courses continue progressively from the beginning to the end. It also introduces sufficient foreign language to enable its graduates to read the professional German or French literature.

While it is highly desirable that the engineer should be a man of broad, general culture, the technical requirements of the courses are so exacting that the engineering student has little time to spare for culture work. To obviate the disadvantage arising from this fact, some general studies are introduced, in order to make his education as broad and comprehensive as is consistent with a thorough training in the direct line chosen.

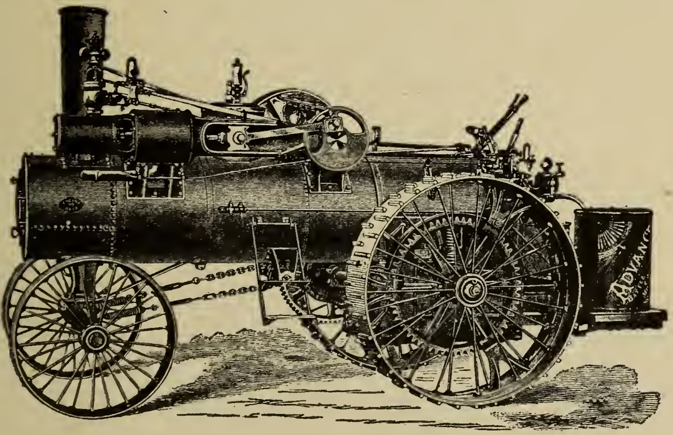
This department offers three systematic courses, as follows:

One in ***Mechanical Engineering.***

One in ***Electrical Engineering.***

One in ***Civil Engineering.***

The first two years are the same for all the engineering courses.



COLLEGE TRACTION ENGINE.

SCHEDULE FOR

ALL ENGINEERING COURSES.

FRESHMAN YEAR.

(Figures indicate the number of recitations or the actual hours of practice per week. Figures in parenthesis indicate the number of the sub-course.)

First Semester.

MATHEMATICS,	5:	Higher Algebra.
LANGUAGE,	6:	German, or French, 4. Rhetoric, 2.
CHEMISTRY (1),	4:	Lectures on the Non-metals, 3; Recitation, 1.
Practicums,	19:	Mechanical Drawing, 7. Shops: Carpentry, 9. Chemistry (2), 3. *Rhetoricals, 1.

Second Semester.

MATHEMATICS,	7:	Trigonometry, 5. Descriptive Geometry, 2.
LANGUAGE,	6:	German, or French, 4. Rhetoric, 2.
CHEMISTRY (2),	4:	Lectures on the Metals, 3; Recitation, 1.
Practicums,	16½:	Drawing: Descriptive Geometry Problems, 3; Mechanical Drawing, 1½. Chemistry (4), Qualitative Analysis, 6. Shops: Wood Turning and Pattern Making, 6.

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*Required of all students not members of a college literary society.

ALL ENGINEERING COURSES—SOPHOMORE YEAR.

First Semester.

Mathematics,	5:	Analytical Geometry (13 wks).
		Calculus (5 wks).
Language,	3:	French.
*History,	3:	The Athenian Empire.
Chemistry (11),	3:	Fuels and Refractory Materials (12 wks).
Machine Design,	3:	Constructive Materials of Engineering (6 wks).
Physics,	3:	General Properties, Mechanics, Heat, and Sound.
Practicums,	21:	Physical Measurements, 6.
		Drawing: From Models and Plates, 6.
		Shops: Forge Work, 9.
		†Rhetoricals, 1.

Second Semester.

Mathematics,	5:	Calculus.
Language,	3:	French.
*History,	3:	The Roman Republic.
Machine Design,	3:	Constructive Materials of Engineering (6 wks).
Chemistry (15),	3:	Metallurgy of Copper, Gold and Silver (12 wks).
Physics,	3:	Light, Magnetism, and Electricity.
Practicums,	21:	Physical Measurements, 6.
		Drawing: Tracing and Blue-Printing, 6.
		Shops, 9: Chipping and Filing (6 wks); Lathe and Planer Work (12 wks).

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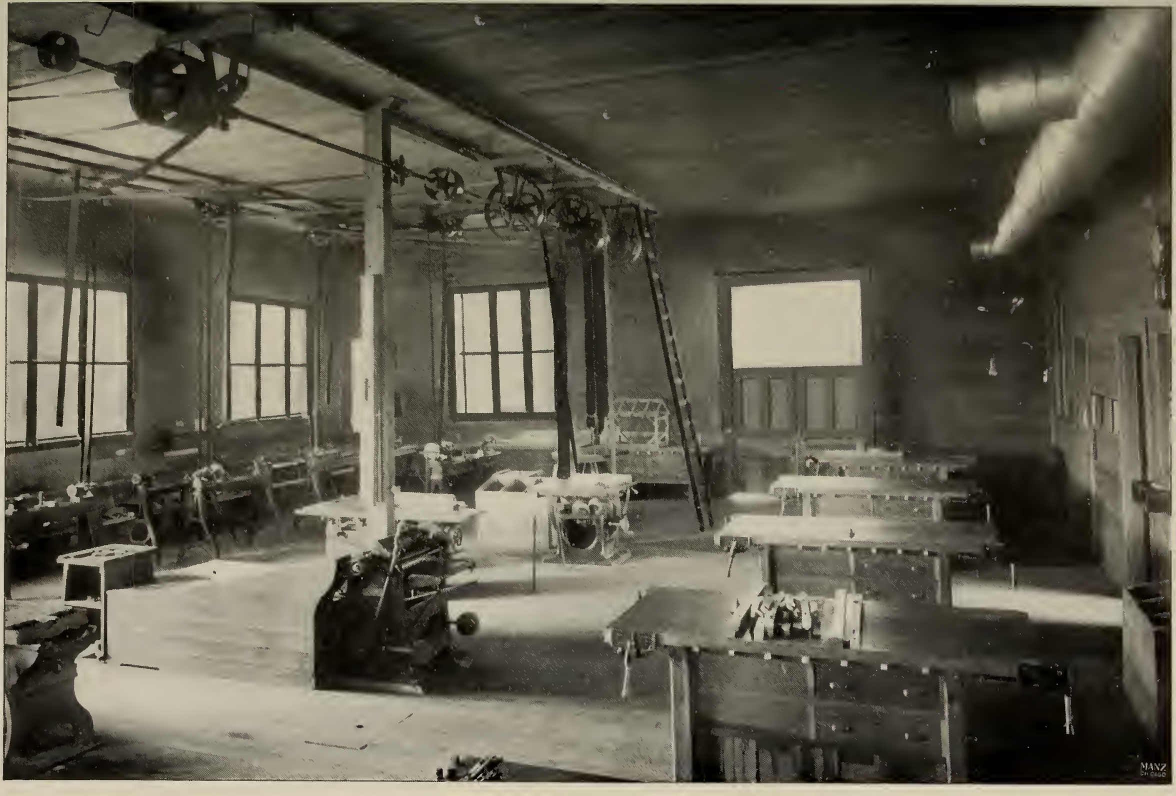
*Required only of those who have taken German as their modern language requirement.

†Required of all students not members of a college literary society.

MECHANICAL ENGINEERING.

This course deals with the science of machines. In order that the student may be capable of intelligently and skillfully designing, constructing and supervising all kinds of machinery, he should pursue a thorough course in which the theoretical goes hand in hand with the practical.

While a broad theoretical training is of primary importance, it is believed that from continued practical applications of theoretic conclusions a broader and more tangible conception of their truths may be derived. To explain theoretic principles, however, is not the only value of the experimental work of the course. If the student desires to go from college to the constructive or operative world, he must be familiar with working machines, methods of shop management, and as much of the everyday detail of the machinist's work as it is possible for him to acquire, as a supplement to his higher training.



Wood Working Shop

SCHEDULE OF

MECHANICAL ENGINEERING COURSE.

JUNIOR YEAR.

(Figures indicate the number of recitations or the actual hours of practice per week. Figures in parenthesis indicate the number of the sub-course.)

First Semester.

Mathematics,	5:	Applied Mechanics.
Electrical Engineering,	5:	Theory of D.-C. Dynamos and Motors (14 wks).
Civil Engineering,	2:	Elementary Surveying, Lectures.
Steam Engineering,	2:	Indicators and Valve Gears (4 wks).
Machine Design,	2:	Kinematics.
Practicums,	21:	Surveying: Field Work (14 wks). Drawing: Problems in Kinematics, 6. Shops: Planing and Milling, 9. Electrical Laboratory: Dynamo and Motor Testing, 6 (4 wks). *Rhetoricals, 1.

Second Semester.

Mathematics,	5:	Applied Mechanics.
Steam Engineering,	2:	Indicators and Valve Gears (8 wks). Steam Boilers (10 wks).
Machine Design,	3:	Graphic Statics of Mechanisms, 2. Hoisting and Conveying Machinery, 1 (10 wks). Heating and Ventilating Machinery, 1 (8 wks).
Practicums,	24:	Drawing: Problems in Machine Design. 9; Dynamo Design, 3. Mechanical Laboratory: Indicators and Valve Gears, 6 (9 wks); Tests of the Strength of Materials, 6 (9 wks). Electrical Laboratory: Dynamo and Motor Testing, 6 (10 wks). Shops: Gear Cutting and Tool Making, 6 (8 wks).

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*Required of those not members of a college literary society.

MECHANICAL ENGINEERING COURSE—SENIOR YEAR.

First Semester.

Steam Engineering,	5:	Thermodynamics of the Steam Engine.
Machine Design:	5:	Mining Machinery, 2. Steam Engine Design, 2. Seminary, 1.
Practicums,	24:	Drawing: Steam Engine Design, 6; Senior Model, 6 Mechanical Laboratory: Steam Engine and Boiler Experiments, 6, Shops: Senior Model, 6. *Rhetoricals, 1.

Second Semester.

Thermodynamics,	2:	Gas Engines and Refrigerating Machinery.
Hydraulics,	5:	Hydrodynamics and Hydraulic Motors, 3. Masonry Dams and Retaining Walls, 2 (12 wks).
Economics,	3:	Principles of Political Economy.
Power Transmission,	2:	Lectures.
Thesis.		
Practicums,	19:	Drawing, 6. Shops: Constructing and Erecting, 4. Assaying, 9 (12 wks).

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*Required of those not members of a college literary society.

DESCRIPTION OF SUB-COURSES.

GENERAL STUDIES.

The general studies of the course—*French*, *English*, *German*, *history*, *civics and economics*—are described under the general science course.

CHEMISTRY AND PHYSICS.

[For Description of Sub-Courses, See Course in Chemistry.]

1, 2, 3. ***General Chemistry.***—Lectures and laboratory.

4. ***Qualitative Analysis.***

5. ***Fuels and Refractory Materials.***

6. ***Metallurgy of Copper.***—Lectures.

20. ***Assaying.***

Physics.—The same as for the general science course. In addition, students can elect advanced work in physical measurements during their junior year.

MATHEMATICS.

For the work in *higher algebra*, *trigonometry*, *analytic geometry and calculus*, see general science course.

Descriptive Geometry.—Projection of lines, planes, surfaces and solids; intersections, tangents to curves and surfaces; problems in warped surfaces, linear perspective, isometric projection. The class room exercises are accompanied by work in the drafting room.

MECHANICS.

1. ***Analytic Mechanics.***—Shaped with special reference to the practical requirements of engineers, principles rather than formulas are emphasized. Deals with statics, kine-

matics, kinetics, energy, center of gravity, moment of inertia, friction, and units and dimensions, and mechanical quantities.

2. ***Applied Mechanics.***—The strength and elastic properties of the most important materials of construction from a theoretical standpoint. Applications of theory to practical problems in beams, columns, shafts, rivetings, springs, etc., followed by a laboratory course in testing. Textbook: Lanza's Applied Mechanics.

3. ***Hydraulics.***—Hydrostatic pressure, theory of fluid motion, theoretical and experimental formulas for flow through orifices and pipes, over weirs, in conduits, canals and streams; accompanied by a course in hydraulic laboratory. A short course in the construction of masonry dams and retaining walls will be given in this connection.

4. ***Testing of Materials of Construction.***—Each student is required to make a definite series of tests of wrought iron, cast iron, steel and wood, in tension, compression, bending, and torsion.

STEAM ENGINEERING.

1. ***Indicators and Valve Gears.***—A study of the slide-valve, both in its simple form and when used in combination with independent cut-off valves, link-motions, and other reversing gears; automatic cut-off gears, and the Zeuner diagram; principles and operation of the indicator.

1 (a). A laboratory course in valve setting; testing and calibrating gauges, indicator springs, thermometers, etc.; care and manipulation of the steam engine, and the taking of indicator cards.

2. ***Steam Boilers.***—A study of their general construction as to strength and form, their advantages and disadvantages; styles of riveting and bracing; tubes, grate areas, and heating surfaces; boiler settings, injectors and feed pumps, and boiler efficiencies.

2 (a). ***Steam Engine and Boiler Testing.***—Complete tests of power plants, including the efficiencies of boiler and engine; calorimeter tests of the quality of steam. Each student is required to perform all the operations necessary for conducting an accurate trial, and to work out the data for an entire test, as well as for individual tests.

3. ***Thermodynamics.***—A thorough course in theory, and its application, especially to steam engines.

3 (a). The laws of thermodynamics as applied to gas engines and refrigerating machinery.

MACHINE DESIGN.

1. ***Elements of Drawing.***—The use of drawing instruments and plain lettering, sketching of machine parts; orthographic and isometric projections; shades and shadows; problems in geometric construction to teach accuracy in the use of instruments; accompanied by occasional lectures.

2. ***Drafting, Tracing and Blue Printing.***—During this course drawings are made from machines, models and plates, the object being to give the student a general idea of the forms of machine parts and the methods of putting them together. The plates used are duplicates of drawings in use for standard machine construction. Finally an entire machine of moderate complexity is taken as a model from which complete working drawings, tracings and blue prints are made. The student is taught to make working drawings, rather than elaborately finished plates.

3. ***Constructive Materials of Engineering.***—Special attention is given to the methods of production, composition, and physical properties of iron and steel, and the effects of heat treatment and methods of working. Sufficient time is also given to the most important special steels, alloys, brasses and bronzes. This course is supplemented by a course in metallurgical chemistry.

4. ***Kinematics.***—A study of the relative motions of machine parts, including belting, toothed gears, cams and linkages. The class room work is supplemented by a parallel course of drafting.

5. ***Graphic Statics.***—General theory of graphic statics, with application: (a) to the determination of stresses in framed structures, under fixed loads; (b) to finding the external forces acting on machine members, and the proper design of machine parts to resist the applied forces. The course consists of both class room work and drafting.

6. ***Hoisting and Conveying Machinery.***—A theoretical and practical discussion of such forms of hoisting and conveying machinery as are commonly found in mines, factories, railway plants and docks. In the drafting-room the student will work out a design for some machine of this class.

7. ***Heating and Ventilating Machinery.***—Lectures on the theory and practice of heating and ventilating as applied to buildings and mines, and the machinery and apparatus used for such purposes. The questions of efficiency and economy will be considered. Good opportunity for observation and experiment is afforded by the heating and ventilating apparatus used in the college buildings.

8. ***Mining Machinery.***—A course of lectures on this subject, covering pumps, air compressors, drills, etc., and the management and care of such machinery.

9. ***Steam Engine.***—The constructive details of some type of automatic cut-off engine will be worked out in the class room, and working drawings therefor made in the drafting-room.

10. ***Senior Model.***—Each class is expected to design, make drawings for, and construct in the college shops, some useful piece of machinery or apparatus, as a part of the work of their senior year. The college furnishes the necessary materials, and the machine on completion becomes part of the college equipment.

SHOP WORK.

1. ***Carpentry.***—The use and care of tools; exercises on the most useful joints and splices; rabbeting, gaining and plowing; framing of timber structures. Each student will be required to frame and erect a miniature building of moderate complexity. The practice work will be preceded by lectures.

2. ***Wood Turning and Pattern Making.***—A systematic course at the lathe and bench in the use of the gouge and chisel in plain and ornamental turning and pattern making; accompanied by lectures on the principles of pattern making and molding, core making and core work.

3. ***Forge Work.***—Exercises in wrought iron, consisting of drawing, upsetting, shaping, and welding. The work in steel includes the forging and tempering of punches, drills, chisels, lathe tools and springs. First semester, sophomore year.

4. ***Chipping and Filing.***—Suitable exercises are provided to teach the student the use of the hammer, chisel, file, and scraper. Six weeks of second semester, sophomore year.

5. ***Lathe Work.***—Exercises in turning, boring, drilling, reaming and thread cutting, in wrought iron, cast iron and brass. Close attention is paid to the proper speed to be used for the different operations and for different materials. The use of calipers and other small tools is taught; and accurate work is required.

6. ***Planing and Milling.***—The planer, shaper, and milling machine are taken up together, and the student learns the limitations and comparative merits of each machine.

7. ***Gear Cutting.***—This includes methods for determining the diameter, and the cutter to be used. The blanks are turned to size on the lathe; the teeth cut on the milling machine.

8. ***Tool Making.***—Exercises in turning, grinding, milling, filing, tempering, and polishing taps, reamers, and dies.

9. ***Senior Model.***—The entire senior year is devoted to

the construction and erection of a complete machine, the design of which has previously been worked out in the drafting room.

Surveying.—The elements of this science are taught, which includes the theory of surveying, the use of the compass, transit, level, chain and rods; all adjustments of instruments; surveying of fields, running of levels, triangulation, computation of areas and earthwork. Both class room and field work.

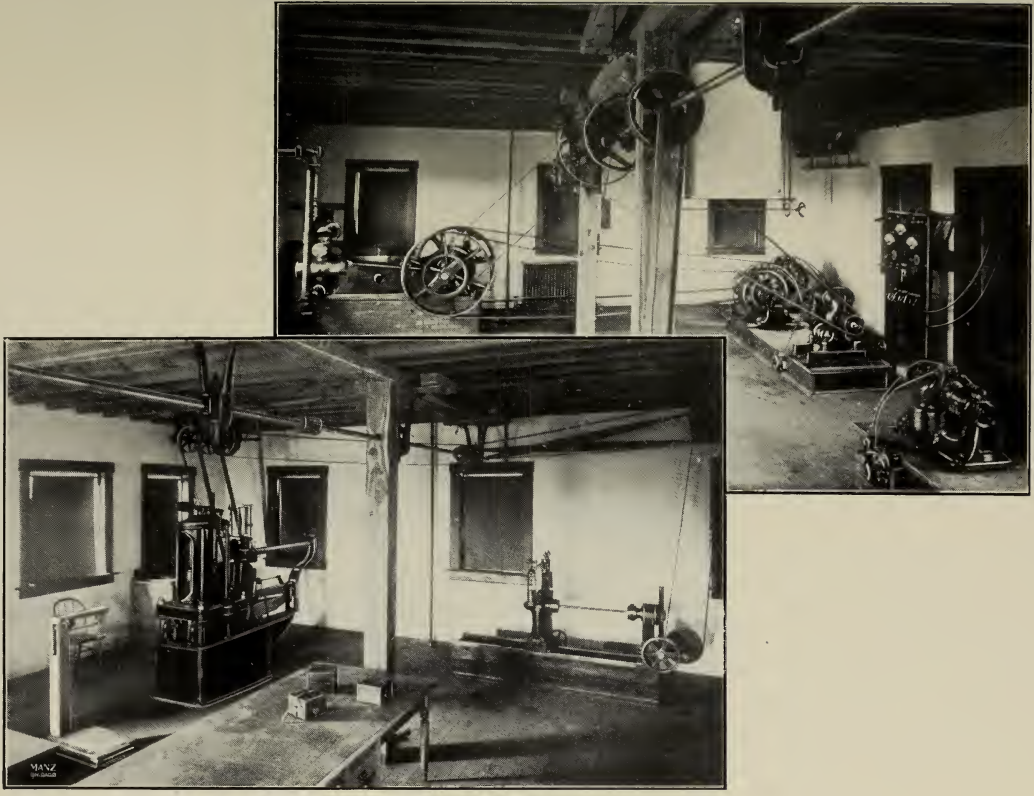
Dynamo and Motor Design.—Electrical engineering, sub-course 1.

Electrical Mining Machinery.—Electrical engineering, sub-course 7.

Power Transmission.—Lectures on the various methods of transmitting power, including shafting, rope, belt, and toothed gearing; hydraulic, pneumatic aud electrical transmission; the adaptability and efficiency of each.

Library Work.—The library is well supplied with standard works of reference and the leading engineering periodicals. Weekly meetings will be held to encourage students in the use of current engineering literature.

Thesis.—Before graduation each student must present a suitable thesis, which shall be the result of original investigation. The subject must be chosen at the beginning of the senior year.



Engineering Laboratory

ELECTRICAL ENGINEERING.

During the past twenty-five years electrical discoveries and inventions have multiplied at a phenomenal rate, and the commercial applications of electricity are now so numerous and so constantly increasing as to make it one of the leading branches of engineering. Its great and growing commercial importance in Montana makes it peculiarly fitting that the state technical school should offer a course in electrical engineering to its students.

The general aim of the course will be to thoroughly ground the student in the scientific laws forming the basis of his profession, at the same time training him to adapt these laws to practice, to use his judgment, and apply strictly accurate and honest methods in all operations.

It is evident that a line of study which accomplishes the ends suggested will furnish an excellent mental training, but it is thought important to introduce additional studies especially adapted to furnish a broad and general culture. Hence a considerable amount of time is allowed for the study of language, history and political science.

As the well equipped electrical engineer must have a thorough knowledge of the principles of steam and hydraulic engineering, machine design and the mechanics of machinery, in addition to the subjects directly belonging to his special department, this course has been based on that in mechanical engineering, differing essentially from it only in the technical courses of the junior and senior years.

A description of the fundamental subjects common to the two courses will be found under the title of the mechanical engineering course.

SCHEDULE OF

ELECTRICAL ENGINEERING COURSE.

FRESHMAN AND SOPHOMORE YEARS.

The same for all Engineering Courses.

JUNIOR YEAR.

(Figures indicate the number of recitations or the actual hours of practice per week.)

First Semester.

Mathematics,	5:	Applied Mechanics.
Electrical Engineering,	5:	Theory of D.-C. Dynamos and Motors (14 wks).
Civil Engineering,	2:	Elementary Surveying, Lectures.
Steam Engineering,	3:	Indicators and Valve Gears (4 wks).
Machine Design,	2:	Kinematics.
Practicums,	21:	Drawing: Problems in Kinematics, 6. Surveying: Field Work, 6 (14 wks). Physics: Electrical Measurements, 9. Electrical Laboratory: Dynamo and Motor Testing, 6 (4 wks). *Rhetoricals, 1.

Second Semester.

Mathematics,	5:	Applied Mechanics.
Steam Engineering,	2:	Indicators and Valve Gears (8 wks). Steam Boilers (10 wks).
Machine Design,	2:	Graphics of Mechanisms.
Electrical Engineering,	5:	Primary and Secondary Batteries.
Practicums,	24:	Drawing: Problems in Machine Design. 9; Dynamo Design, 3. Mechanical Laboratory: Indicators and Valve Gears, 6 (9 wks); Tests of the Strength of Materials, 6 (9 wks). Electrical Laboratory: Dynamo and Motor Testing, 6 (10 wks). Primary and Secondary Batteries, 6 (8 wks).

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*Required of those not members of a college literary society.

ELECTRICAL ENGINEERING COURSE.—SENIOR YEAR.

First Semester.

Electrical Engineering,	5:	Theory and Application of Alternating Currents.
Steam Engineering,	5:	Thermodynamics of the Steam Engine.
Machine Design:	1:	Seminary.
Practicums,	24:	Drawing: Commercial Electrical Machinery, 8. Mechanical Laboratory: Steam Engine and Boiler Experiments, 6, Electrical Laboratory: Alternating Currents, 4. Shops: Planing, Milling and Gear Cutting, 6. *Rhetoricals, 1.

Second Semester.

Electrical Engineering,	7:	Electric Light and Power Transmission, 2. Electrolysis and Electro-Metallurgy, 3 (8 wks). Electric Railways, 3 (10 wks). Electrical Mining Machinery, 2 (10 wks).
Hydraulics,	4:	Hydrodynamics and Hydraulic Motors, 2. Masonry Dams and Retaining Walls, 2 (12 wks).
Economics,	3:	Principles of Political Economy.
Power Transmission,	2:	Lectures.
Thesis.		
Practicums,	13:	Drawing: Alternating Current Machinery, 4. Electrical Laboratory: Alternating Currents, 5. Electro-Metallurgy, 4.

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*Required of those not members of a college literary society.

DESCRIPTION OF SUB-COURSES.

1. ***Direct Current Dynamos and Motors.***—The principles of electro-magnetism, the laws of simple magnetic circuits, and the winding of electro-magnets; principles, design, construction, and testing of direct-current dynamos and motors. The theoretical work will be followed by the complete design, in the drafting room, of a dynamo or motor. Textbook: Jackson's Electro-Magnets and Dynamo Construction.

1 (a). ***Dynamo and Motor Testing.***—A laboratory course in which students determine the characteristic curves, resistances, inductances, magnetic leakage, and efficiencies of various types of direct-current machines.

2. ***Batteries.***—Construction and working of primary and secondary batteries, and their commercial use. In connection with the class-room work, students will make comparative efficiency and regulation tests of various standard types of primary and secondary batteries. On account of the rapidly increasing use of accumulators, the greater part of the course will be devoted to them.

3. ***Alternating Currents.***—The theory of the generation and utilization of alternating currents; the design and construction of alternating current dynamos, transformers and motors; methods of testing alternating current machinery. In connection with this course the student will work out, in the drafting room, complete designs for several commercial alternating current machines. Textbook: Jackson's Alternating Currents and Machinery.

3 (a). ***Alternating Current Testing.***—Laboratory tests to determine self-induction, capacity, and mutual induction of alternating current circuits; regulation and efficiency of transformers, dynamos and motors; polyphase testing in the second semester.

4. ***Electrolysis and Electro-Metallurgy.***—Electrolytic theory and its practical applications to electrotyping, electro-

plating, the treatment of ores, and electrolytic separation and refining of metals. Lectures and laboratory work.

5. ***Electric Light and Power Transmission.***—A study of the different systems of distribution used in arc and incandescent lighting, the advantages and disadvantages of each; the selection and arrangement of machinery for generating-plants; the location, erection and cost of distributing lines; the transmission and distribution of power by direct current, single and polyphase alternating current systems.

6. ***Electric Railways.***—Selection, installation and arrangement of engines, boilers and generators for city and suburban power plants; types of apparatus, and methods of control in power house, and on cars; erection and testing of circuits; car equipments and wiring; methods of track location, construction and maintenance; selection of equipment for special conditions; storage battery traction, and storage battery auxiliaries.

7. ***Electrical Mining Machinery.***—The special applications of electrical power in mining operations, electrical pumps, air compressors, hoists, drills and cutters; electrical haulage; electric lighting and ventilation of mines.

Electrical Measurements.—A laboratory course in measurements of precision; calibration and testing of instruments, using the voltameter, standard cell, Kelvin balance, etc.; determination of magnetic induction, permeability, and hysteresis losses by the ballistic method; testing of electric lines for the location of faults and grounds.

Journal Reading is encouraged, and frequent conferences will be held to discuss topics of interest in the current periodicals. The library is well supplied with leading engineering periodicals, transactions of engineering societies, and standard books of reference.

Thesis.—Before graduation each student must present a suitable thesis, which shall be the result of original investigation. The subject must be chosen at the beginning of the senior year.

CIVIL ENGINEERING.

PROF. FORTIER.

The purpose of establishing this course at the present time is to afford a training of a practical as well as theoretical nature to young men who are desirous of entering the profession of civil engineering. The success which has attended the partial development of the wonderful resources of the state has been due in a large measure to the skill and intelligence of the educated civil engineer, and his work has just begun. Railroad transportation is in its infancy, the highways are for the most part in their natural state, millions of acres are still unsurveyed, and a tenth of the irrigible land has not yet been reclaimed from its natural aridity. Scores of new towns have been founded, which will soon grow into flourishing cities, and the demands of their citizens will tax anew the skill of the engineer. Having assurance of the future prosperity of this state and confidence in the intelligence and resourcefulness of the youth within its confines, it is but fitting that ample provision should now be made to train the young men of Montana, that they may in time take up and carry on the work which has been so well begun by those who were educated in eastern and foreign technical colleges.

The foundation of this course consists in language and mathematics, physics and chemistry. These are the four pillars on which the education of the engineer rests. The first two years are the same in all engineering courses, and are devoted mainly to acquiring a knowledge of these subjects. The last two years are taken up with the practical and theoretical work connected with the subjects outlined in the sub-courses.

In arranging the studies of the junior and senior years greater prominence has been given to that branch of engineering which relates to the storage, conveyance and use of water in order to meet the requirements of an arid country. The development of water privileges, the design and construction of storage reservoirs and irrigation canals, the need of competent managers and superintendents to operate them, and the supervision and control of the appropriated waters, require men who are trained both in the theory and practice of hydraulic engineering.

The student in surveying who completes the course herein outlined should be fairly proficient, not only in the theoretical part of the work, but in the use of instruments and in making surveys of private and public lands, city lots, canals and railroads. The object of the course is to qualify young men to fill with credit to themselves and this institution the positions of county surveyors, city engineers and competent instrument men on engineering parties in general.

The course also includes a study of the engineering problems of the municipality. The student is made familiar with the essential features, both from a scientific and practical point of view, of waterworks and fire protection, sewerage and sanitation, city and street pavements.

SCHEDULE OF CIVIL ENGINEERING COURSE.

JUNIOR YEAR.

First Semester.

APPLIED MATHEMATICS,	5:	Analytical Mechanics.
SURVEYING,	5:	Surveying and Leveling.
MUNICIPAL ENGINEERING,	3:	Roads, Streets and Pavements.
MACHINE DESIGN,	2:	Kinematics.
Practicums,	21:	Field Practice in Surveying.
		Platting Surveys.
		Drawing: Problems in Kinematics, 6.
		*Rhetoricals, 1.

Second Semester.

APPLIED MATHEMATICS,	7:	Applied Mechanics, 5.
		Graphic Statics, 2.
HYDRAULIC ENGINEERING,	5:	Hydraulics.
		Hydraulic Motors.
	2:	Storage Reservoir Dams.
ECONOMICS,	3:	Principles of Political Economy.
Practicums,	15:	Testing the Strength of Materials (9 wks).
		Mineralogy and Assaying (9 wks).

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*Required of all students not members of a college literary society.

CIVIL ENGINEERING COURSE.—SENIOR YEAR.

First Semester.

Hydraulic Engineering,	5:	Irrigation.
Surveying,	3:	Geodetic Surveying.
Language,	2:	English Literature.
Railroad Engineering,	5:	Railroad Location and Construction.
Practicums,	12:	Engineering Designs.
		Field Practice in Surveying.
		*Rhetoricals, 1.

Thesis.

Second Semester.

Municipal Engineering,	5:	Waterworks and Sewer Systems.
Electrical Engineering,	5:	Electric Light and Power Transmission.
		Electric Railways.
		Electric Mining Machinery.
Business Forms,	1:	Engineering Contracts and Specifications.
Language,	2:	English Literature.
Practicums,	12:	Engineering Designs.
		Hydrographic Surveying.

Thesis.

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*Required of all students not members of a college literary society.

DESCRIPTION OF SUB-COURSES.

Hydraulics.—This includes a discussion of the fundamental laws governing the equilibrium of fluids; the measurement of water by orifices, weirs, rating flumes, floats, and current meters; and the flow of water in pipes, conduits, ditches, canals, sewers and rivers, with especial reference to the irrigation canals, city water supplies, and hydraulic power plants of the Rocky Mountain states.

Hydraulic Motors.—The dynamic pressure of flowing water; a description of the hydraulic motors and centrifugal pumps in use, and a theoretical discussion, followed by laboratory work on the action of water on vanes, water wheels and pumping engines.

Storage Reservoir Dams.—The necessity of water storage in arid America; the building of earth, loose rock and masonry dams, and computing the stresses in masonry dams.

Irrigation.—The location, grade and cross section of canals; the design and construction of flumes, headgates, diversion dams and weirs; rainfall, evaporation and seepage; duty of water; methods of irrigation; the control and distribution of water; irrigation legislation in western America, and a brief history of irrigation in foreign countries.

Surveying.—Elementary surveying embraces chain surveys, the adjustment of instruments, transit surveying and leveling, the location of railways and canals, topography and the use of the plane table, and platting field surveys.

Advanced surveying includes precise leveling, the measurement of base lines, triangulation, hydrographic surveying, the determination of the meridian of a place and the survey of the public lands.

Roads, Streets and Pavements.—Highways, their location, construction and maintenance; highway bridges and culverts; the paving of city streets and sidewalks; the materials used and the mode of construction.

Applied Mechanics.—This subject is common to all the engineering courses, with the exception of graphic statics, which in this course will be taught in connection with roofs and bridges.

Kinematics.—The same as in the other engineering courses.

Roofs and Bridges.—This subject is an application of the study of mechanics to roofs and bridges: dead and live loads; lateral truss systems; pin-connected structures; marketable forms of iron and steel and their application in the design of roofs and bridges; the stresses in various members will first be determined analytically and afterwards checked by graphical statics.

Railroad Engineering.—This subject is begun by locating a part of a proposed railway, discussing the theory of curves, establishing the grades and cross sections, calculating the cubical contents, and making a map and profile of the proposed line. The lecture notes, in a general way, embrace the best practice of the present time in railway location and permanent way, with descriptions and criticisms of the principal structures.

Municipal Engineering.—By means of lectures, problems and assigned reading the student will be given an outline of modern methods of municipal construction, and will be made familiar with the principles in the following branches: Domestic water supplies, the sewerage of cities, and rapid transit. Electric lighting and electric railways are included in the course in applied electricity.

Electrical Engineering.—A course of general lectures on the generation and transmission of electric currents, both direct and alternating, and their applications to lighting purposes, the operation of electric railways, shop and mining machinery. This course is designed especially for civil engineers, and treats the subject from the operative rather than the designing standpoint.

Summer Report.—During the summer vacation each junior student is required to prepare a report on some structural work connected with the profession.

MILITARY SCIENCE.

It is expected that an officer will be detailed by the Secretary of War for the purpose of instructing the students in military science and tactics.

Military Drill is required of all male students, unless excused by the faculty for special reasons, and satisfactory work in this department will be requisite for graduation.

Object.—The object of instruction in this department is to improve the habits and manners of the students, and also for the development of health and physical form, but at the same time it gives that military knowledge which every citizen should possess, that he may render intelligent aid to his country or state in case of emergency.

It cultivates a manly spirit, a ready and implicit obedience to orders, a respect for authority, and a self-restraint which are of inestimable value to the young man on leaving college.

Instruction is both theoretical and practical.

Practical.—This instruction begins with the school of the soldier, including the setting-up exercises, military gymnastics and bayonet exercise, which give an erect and soldierly bearing.

The squad drill will be followed by company and battalion drill.

Artillery Instruction will consist in the care and service of two field-pieces. Considerable attention will be given to target practice, military signaling, practice marches, and camping. The College is already supplied with Springfield rifles, and a liberal supply of ammunition.

Theoretical.—Elementary instruction will be given by means of lectures and recitations in the art and science of war, armies and their organization, modern tactics, small arms, explosives, care of troops in the field, military correspondence and reports, military and martial law, including the relations between the military and the civil.

War Department Record.—At the close of the year the names of the three cadets in the graduating class, most distinguished in military science and tactics, are reported to the War Department for insertion in the United States Army Register. The military instruction will occupy about three hours weekly, and will not interfere with the students' regular work.

Uniform.—Students will be expected to provide themselves with the regulation military uniform, which is both inexpensive and durable.

No person will be allowed to take military drill who is not doing other college work.

REQUIREMENTS FOR ADMISSION.

Candidates for the freshman class, in any of the college courses, must be graduates of the Preparatory department, of an accredited high school, or must pass a satisfactory examination upon the subjects included in the requirements of the State Board of Education for accredited high schools.

The following is the list of accredited high schools:

Anaconda,
Bozeman,
Butte,
Dillon,
Great Falls.
Helena,
Kalispell,
Miles City,
Missoula.

Advanced Standing.—This College will accept records from all reputable colleges for credits for advanced standing. Such records are accepted so far as they cover, or are equivalent to, the work done in the course in which the candidate applies for advanced standing.

DEGREES.

Upon the satisfactory completion of any of the college courses the following degrees will be conferred:

For the general science course, the biological course, and the home science course, the degree of

Bachelor of Science.

For the course in agriculture, the degree of

Bachelor of Scientific Agriculture.

For the course in chemistry, the degree of

Bachelor of Analytical Chemistry.

For the course in mechanical engineering, the degree of

Bachelor of Mechanical Engineering.

For the course in electrical engineering, the degree of

Bachelor of Electrical Engineering.

For the course in civil engineering, the degree of

Bachelor of Civil Engineering.

ADVANCED DEGREES.

On the completion of one year of post-graduate work or three years of professional work, and the presentation of an acceptable thesis, the College will confer upon the holders of bachelors' degrees, in their respective courses, the degrees of *Master of Science*, *Master of Scientific Agriculture*, *Analytical Chemist*, *Mechanical Engineer*, *Electrical Engineer*, *and Civil Engineer.*

THE GALLATIN FOREST RESERVE.

This reserve was set apart by Presidential proclamation February 10, 1899, and consists of the even numbered sections in a tract nine miles east and west and fourteen miles north and south. There are sixty-three sections of land included in the reserve, with the exception of 280 acres of patented land and 160 acres of homestead entry, making a total of 39,880 acres.

It covers the headwaters of Bozeman, Middle and Cottonwood creeks, and affords the College and station excellent opportunities for investigations in the twin sciences, forestry and irrigation.

The creation of this Reserve assumed tangible form in 1897 by the circulation of a petition to the Secretary of the Interior for the setting apart of this portion of the public domain for the study and scientific investigation of forestry and irrigation. This petition received the endorsement of the National Irrigation and Forestry Congresses in 1898, as well as that of many distinguished workers in these lines, with the result that the Reserve has been duly created and set apart for the specific purposes indicated.

The Montana College of Agriculture and Mechanic Arts has reason to be proud of the fact that, while it is the youngest of all such state institutions, it is the first to secure so valuable an aid to the study of these important adjuncts of agriculture.

PREPARATORY DEPARTMENT.

Miss M. A. Cantwell, Principal.
Miss May Travis, Instructor.
Miss Virginia H. Corbett, Instructor.

This department of instruction was last year extended to three years, thus placing it on a level with the accredited high schools of the state.

The course as it now stands provides, not only a thorough drill in the common branches, but in addition, elementary work in the natural sciences, a choice in the languages, some knowledge of manual training, and domestic science.

The object of this course is to prepare students for the freshman class in College. It furnishes a fair general knowledge to those whose circumstances will not allow taking a regular college course, and is also helpful to those qualifying themselves to teach.

A liberal course of reading is given for each year, and students are requested to cover the course as a part of their required work. It is also desirable that students purchase, as far as possible, these books, thus making them a part of their own library.

For entrance the student should be at least thirteen years of age, and should have finished the work requisite for admission to the ninth grade of high school work.

Applicants will be required to pass an examination, or otherwise satisfy the faculty of their proficiency before entering any classes.

To Parents and Students.—It is highly important that students should enter at the opening of the year, as much of the year's work is based upon the principles laid down at the beginning.

Bring all your textbooks, as they will be of much assistance for reference.

Preparatory Physics Laboratory

PREPARATORY COURSE.

(Figures indicate number of exercises per week.)

First Year.

FIRST SEMESTER.	SECOND SEMESTER.
Latin or Etymology, 5.	Latin or Literature, 5.
Algebra, 5.	Algebra, 5.
English Composition, 5.	Physical Geography, 5.
Anatomy and Physiology, 3.	Civics, 3.
(Laboratory, 4.)	Sewing, for Women, 3.
	Drawing, for Men, 3.

Second Year.

FIRST SEMESTER.	SECOND SEMESTER.
Latin or German, 5.	Latin or German, 5.
Algebra, 3.	Mathematical Review, 3.
Rhetoric, 3.	Rhetoric, 3.
Drawing, 8.	Drawing, 4.
Rhetoricals, 2.	Horticulture or Cooking, 3.
	Botany, 2; (Laboratory, 4.)
	Rhetoricals, 2.

Third Year.

FIRST SEMESTER.	SECOND SEMESTER.
Latin or German, 4.	Latin or German, 4.
Geometry, 5.	Geometry, 5.
Physics, 3; (Laboratory, 6.)	Physics, 3; (Laboratory. 6.)
General History, 5.	American Literature, 5.
	Rhetoricals.

English.—The work in English includes (1) etymology and literature, (2) English composition, (3) rhetoric, (4) American literature.

(1). ***Etymology and Literature.***—One semester of etymology is offered to those who elect English in the first year of the preparatory course. A brief history of the growth of the English language is given, followed by exercises in word-building with Greek, Latin and Anglo-Saxon prefixes, suffixes and roots. The student thus becomes familiar with the derivation of many common words, as well as with the significance of terms which he will use later in the sciences. Swinton's textbook is used. Skinner's Studies in Literature used as the basis of work during the second semester. The purpose of this course is to teach pupils to understand the art in literature and to develop their power of appreciating masterpieces of English. This fundamental work is followed by a brief historical outline study of the periods of English literature.

(2) and (3). ***English Composition and Rhetoric.***—The aim of the course in English composition and rhetoric is to secure accurate and graceful expression, and to afford constant exercise in composition work. In connection with this work a classic will be made the subject of class-room study, thus forming a basis for the study of American literature.

(4). ***American Literature.***—The same general methods used in the literature of the first year will be followed in this course, the object being to develop intelligent appreciation of American masterpieces, and to promote a love for our standard literature. Several American classics will be made the subject of critical class-room study. The student will find in the library valuable works of reference.

General History.—The work in history will follow as far as practicable the line suggested for high school work by the State Board of Education. The object of the course will be an acquaintance with the great epochs of history, with special attention to what Greece and Rome have done for the world's civilization. A textbook will be used, supplemented by library references whenever desirable.

Latin.—(1). In the first year's work the aim is to secure a ready knowledge of the inflection forms, the main rules of syntax, and a vocabulary which will prepare for easy Latin reading. For this purpose Collar and Daniell's First Latin Book is used, which in connection with grammatical study gives reading lessons adapted to the ability of the learner. (2). Drill similar to that of the first year is continued in this course in connection with the reading of easy selections from classic authors—such as are found in Arrowsmith & Whicher's Latin Reader. The aim is to enable the student to read the simpler classics readily. (3). CICERO,—The four orations against Catiline are read, and three others. Work in prose composition is required during a part of the time. Roman politics, as compared with those of our own day, always interest students who have an intelligent interest in current events, and there is every opportunity for such comparative study in this course.

German.—In accordance with the present college entrance requirements in Montana, two years of German are now offered in the preparatory course as a substitute for Latin. The work of the first year is of the usual elementary nature, including study of grammar, composition, pronunciation, careful reading of easy texts and sight reading. The second year's work is also largely practical, but affords as well an introduction to classic German literature. The required reading, during the two years, is not less than 600 pages.

Mathematics.—The subject of mathematics, embracing (1) algebra, and (2) geometry, is made practical as far as may be. Actual measurements are taken by the students, and original demonstrations, involving previous principles, are carefully brought out. A mathematical review will be given in the second semester of the second year, whereby students will be enabled to bring up delinquencies.

Elementary Physics.—This subject is taught almost solely by means of experiments performed by the students, only such additional instruction being given as shall be necessary to bring about a more thorough appreciation of the principles involved in the different experiments. The student is required to keep neat and complete notes on each experiment, and to answer questions intended to bring out a full understanding of the problems studied.

Human Anatomy and Physiology.—The elements of human anatomy, gross and microscopic. Form, structure and position of organs. Dissections of common mammals before the class. The activities and functions of organs in health and disease. General principles of nutrition, exercise and sanitation.

General Botany.—Structure, morphology and classification of phanerogams, introductory to the more advanced courses. Each student is expected to collect, press and name 100 species, 20 of which must be properly mounted for a herbarium. Recitations or lectures 2, and laboratory 4 hours per week; second semester, second year.

TEXTBOOKS: Gray's Lessons and Coulter's Manual of Rocky Mountain Botany.

Drawing.—Free-hand drawing from geometric solids and casts. Study of light and shade. Clay modeling. Object drawing. Study of plant forms, with suggestions for their application to design. Memory and time drawing. Blackboard work frequently.

Horticulture.—Three periods per week in second semester of the second year. Instruction will consist of lectures upon orcharding and small fruits, with field work in same. *Amateur Fruit Growing*, by Prof. Samuel B. Green, will be used as a textbook.

Rhetoricals.—This course will consist of reading and vocal drill; exercises for the development of the voice-producing muscles, and general physical culture. During the second semester each student will prepare a recitation to be given before the class.

Physical Geography will be taught the second semester of the first year. Maury's textbook will be the basis of work, but as much field work will be done by the student as will make the subject practical.

Domestic Science.—A systematic course in hand and machine sewing is given during the seeond semester. Each student furnishes her own materials, as the garment made forms a part of her own wardrobe. Students passing a satisfactory examination in sewing will be excused.

Cooking.—The work of this course is carried on during the second semester of the second year, and is both theoretical and practical. Special attention is given to table setting, table etiquette, and serving of meals. A reception is given during this semester to the faculty and members of the board.

Civics.—The work in this subject occupies three hours per week during the second semester of the first year, and embraces the study of the Constitution of the United States, also the study of the Montana state constitution. Class discussion on interesting topics pertaining to the subject is encouraged. Special attention will be given to current topics.

Military Drill will be required of male students.

Graduation.—Regular graduating exercises are held in this department, and students who satisfactorily complete the preparatory course will be given a suitable diploma.

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COURSE OF READING FOR PREPARATORY DEPARTMENT.

First Year.

Merchant of Venice.
Dickens' Child's History of England.
Thanatopsis, to be memorized.
Emerson's Fortunes of the Republic.
Conquest of Mexico.
Ivanhoe, Kenilworth, or Rob Roy.
Boys of '76.

Second Year.

David Copperfield, Oliver Twist.
Pickwick Papers, or Bleak House.
Silas Marner.
Kathrina.
Last Days of Pompeii.
Sesame and Lilies.

Third Year.

Heroes and Hero Worship.
Emerson's Essay on Behavior.
Lectures on Architecture.
Prince of India, or Ben Hur.
Autocrat of the Breakfast Table.

BUSINESS DEPARTMENT.

H. G. PHELPS, PRINCIPAL.
MISS EMMA STOCKINGER, INSTRUCTOR.

Requirements for Entrance.—Students wishing to pursue any of the courses in this department must possess a grammar school education.

COURSE IN BOOKKEEPING.

FIRST SEMESTER.	SECOND SEMESTER.
Penmanship, 5.	Debating, 2.
Bookkeeping, 10.	Penmanship, 5.
English Grammar and Business Correspondence, 5.	Office Practice or Bookkeeping, 8.
Business Law (10 wks), 5.	Commercial Geography (10 wks), 5.
Business Arithmetic (8 wks), 5.	Descriptive Economics (8 wks), 5.
	Elementary Algebra, 5.
	Rapid Calculations, 5.

English Grammar.—This subject is taught from the standpoint of its practical application to the affairs of business life. The student is taught to use what is learned.

Business Correspondence.—This subject is taught by means of a text. It includes business letters, petitions, remonstrances, resolutions, and other subjects relating to business affairs.

Debating.—The classes are organized into sections, and debate upon business topics discussed in textbooks used, and such other subjects as are agitating the business world.

Business Arithmetic.—Only those subjects relating to business affairs are taught and used in such a manner as will put the student in possession of a fund of useful knowledge, which he can readily apply in bookkeeping and business calculations.

Elementary Algebra.—This subject is taught with a view to its direct application to arithmetic. In fact, the text used applies the principles to arithmetic at once, thereby making the subject easy for students who would otherwise find it difficult.

Penmanship.—We teach what is known as *Simplified Script*, which puts the student in possession of a handwriting which is at once plain, simple, readable.

Business Law.—The study of commercial law is made interesting from start to finish. The student is taught the fundamental rules governing contracts, commercial paper, sales of personal property, bailments, insurance, interest, etc. The practical side of the subject is the drawing of all kinds of legal papers, from the simple contract to the complete organization of corporations. The library contains many books of reference to which the student has access.

Descriptive Economics is a short course in political economy. The student studies such interesting subjects as economics of the family, village, city, nation; international economics, international commerce, international economic problems, and world economy. No attempt is made to complete the student's knowledge of this broad subject, but simply to put him in possession of valuable principles which will enable him to continue this subject intelligently.

Commercial Geography.—This subject treats of the geographical importance of different countries with direct bearing on commerce. The student becomes familiar with all the raw and manufactured materials and the countries from which they are obtained. Railway, steamship, and other modes of transportation are prominent features of the course.

Business Department

Bookkeeping and Business Training.—As soon as the student enters school, he is given a cash capital of $5,000, and at once begins business for himself, buying and selling merchandise and performing all kinds of transactions among his fellow-students. The Ellis System, "Learn to Do by Doing," is used. This system is now recognized everywhere to be the best system published. The business department has been fitted with all modern equipment for the use of this system. The work is so thoroughly practical and interesting that the students generally devote more hours than are required by the curriculum.

Business Sections.—The main room of the bookkeeping department is divided into three sections, viz: Section No. 1, Section No. 2, and the Chicago house. Each section is a city in itself, and the students perform their transactions orally among themselves and the different offices of that section. But all business with students of the other section or the Chicago house is done by correspondence. Hence we have inter-communication work right at home. The students of one section are entire strangers to those of the other, so far as their business dealings are concerned.

The two sections and the Chicago house are connected by railroad, which carries the mail and freight from one section to the other.

OFFICE DEPARTMENT.

Each section is furnished with a complete set of offices, such as College National bank, Merchants' bank, Commercial Exchange, railroad and postoffice.

These offices are under the efficient management of the post graduate students during the first semester.

At the beginning of the second semester, students of the bookkeeping department take charge of the offices, superintended by the post graduates.

Graduation.—Those who complete the course in a satisfactory manner will receive a business department diploma.

Special Students.—We think it best for students to take the entire course, and urge them to do so, beginning the first term; but such students as cannot spend one year may enter and take such subjects as are best adapted to their special needs.

Cabinet Deposit.—A deposit of $1.00 is required for the use of the cabinet of instructions. The deposit will be returned to the student upon the return of the cabinet, in good condition.

POST GRADUATE COURSE IN BOOKKEEPING.

Requirements.—Those who have finished the regular course in bookkeeping are eligible to this course.

FIRST SEMESTER.	SECOND SEMESTER.
Banking, 5.	Auditing (10 wks), 5.
Penmanship, 5.	Financial Problems (8 wks), 5.
Typewriting, 5.	Lettering and Engrossing, 4.
Shorthand, 5.	Shorthand, 5.
Office Management, 10.	Typewriting, 5.
	Thesis.

This course is designed to give the student a higher technical knowledge of accounts. He is first taught the principles of auditing in proprietorship, partnership, and corporation bookkeeping. He then takes charge of the books of students which are out of balance or incorrectly written up or kept. This work is under the direction of the instructor.

In financial problems he finds much valuable work in solving problems of different degrees of complexity, winding up the affairs of partnerships, corporations, and estates. Much of the course is original investigation.

Shorthand and typewriting are given throughout the year, in which time the student should become quite proficient as an amanuensis.

Upon graduation the degree of Master of Accounts will be conferred.

COURSE IN SHORTHAND AND TYPEWRITING.

FIRST SEMESTER.	SECOND SEMESTER.
English Grammar and Business Correspondence, 5.	Debating, 2.
Penmanship, 5.	Penmanship, 5.
Business Law (10 wks), 5.	Reporter's Companion, 5.
Shorthand, 5.	Dictation (Business Letters), 5.
Typewriting, 5.	Dictation (Typewriter), 5.
	Bookkeeping, 8.

Requirements for Entrance.—Those wishing to pursue this course should possess a good English training, without which their services would be entirely useless to the employer. Owing to this fact, we must demand, for the good of both student and school, that the student equip himself in this necessary qualification before graduation. We have attempted to assist the student by giving one year's work along this line. The instructor will outline a course of outside reading and study which will aid the student in his work.

Demand for Stenographers.—There is an ever increasing demand for shorthand writers. We are unable to supply the demand for those who can do first-class work.

Time Required.—This depends on circumstances and the student's application and natural aptitude. Together with the other branches of the course, the student of average ability should complete the shorthand in one year.

System.—The system used is the Benn Pitman, or "The American System."

Graduation.—If the student has done all the work in a satisfactory manner and has attained a speed of 100 words per minute, and can read and transcribe the same on the typewriter without hesitation, he will be entitled to graduation and receive a diploma.

GENERAL INFORMATION.

Recitation and Study.—The number at the right hand of each branch denotes the number of recitations per week. Each recitation requires about two hours of preparation, except laboratory, or afternoon work, which may not require preparation.

Two Courses not Allowed.—Experience teaches that it is not best for students to take two courses at one time. They almost invariably fail in both. The student should consider well which course he wishes to take. When he has decided, he should give his entire time and attention to that course. This regulation does not apply to special students who wish to take one or two studies in each course.

Should the student fail to finish a course in this department the first year, upon his return he will be permitted to begin where he left off and finish earlier in the next year.

Expenses.—Entrance fee for the year, $12, payable $6 at beginning of each semester; books and stationery, about $12; board and room with private family from $16 to $20 per month.

First semester opens Sept. 19, 1900.

SHORT COURSE IN AGRICULTURE.

This course is designed to meet the wants of those who wish to make a more practical study of agriculture and who cannot remain throughout the entire college year.

The work has been planned to give the largest amount of information and assistance possible. The subjects taught are those of which every farmer should have a full and clear knowledge, and are presented in a manner to make the information helpful in the highest degree.

The school course, coming as it does in the winter, when the work on the farm is at a minimum, presents the best opportunity for the farmer to avail himself of the instruction given.

In the establishment of this course it was the desire of the board and faculty to present a comprehensive scheme of study that would be as inexpensive as possible. The student is required to pay a general fee of $5, and fees covering the cost of material used. He has the free use of the college library, containing 3,700 carefully selected volumes and 2,500 pamphlets, besides the best agricultural papers published, choice magazines, daily and weekly newspapers.

The student may select those subjects which will best suit his wants. It is required that he take at least three of the subjects taught.

This course begins Jan. 7, 1901, and continues for 13 weeks.

AGRICULTURE.

PROF. ROBT. S. SHAW.

Farm Dairying.—These lectures treat of the adaptability of this branch of farming to certain localities; small dairies and creameries; butter and cheese making, testing of milk; the use of the lactometer and the Babcock milk test. Breeds of dairy animals; rearing, feeding, and management of dairy cows.

Cultivation of Farm Crops.—This subject deals with the preparation of land for crops; plowing, harrowing, seeding, irrigating and harvesting; various methods used and their action upon soil and crops; rotation and fertilization of crops; summer fallowing; preservation and maintenance of fertility; manufacture and use of fertilizers, composition and physical properties of the soil; conservation of moisture and plant food; the atmosphere as a source of plant food; action of frost, wind and climate on crops.

Breeds and Breeding.—The subject of breeds of live stock treats of the characteristics of each breed, their origin and adaptability to various conditions in the countries from which they originated. Comparison is made of these conditions with those present in Montana, and the breeds best adapted to our climate, range and market are indicated. An insight is given into the methods of registering stock, thus leading to a knowledge of the use of the herd book and the value of pedigree.

The care of breeding animals; practice, principles and methods of breeding, including atavism, heredity, selection, control of sex, in-breeding, crossing; parental and climatic influences, with special reference to conditions present in Montana.

Feeds and Feeding.—This subject deals with the constituents of foods and their relation to the animal body. Various feeding standards; nutritive ratio; feeding stuffs; preparation and harvesting of roots, fodders, etc. Feeding for beef, mutton, pork, milk, work, and a maintenance ration. The effect of food upon the various breeds, and the influence of the individuality of animals. The object of this work is to aid the student in becoming a practical and intelligent feeder. He is given an opportunity to see the principles taught in the class room practically applied in the feeding of the various animals under experiment on the experiment station.

Poultry.—Lectures on breeds, their characteristics and comparative values for special purposes; construction of poultry houses; feeding and management.

Apiculture.—A course of lectures, with illustrations as far as possible, showing methods of construction and use of appliances required, as well as methods used in the care and handling of bees.

HORTICULTURE.

Director S. M. Emery.

First Year—Instruction in horticulture will be given by lectures, laboratory practice and field work.

Special attention will be given to the various methods of propogation; by seeds, cuttings, layers, buds and grafts. Selection of sites for orchards and small fruit plantations, with reference to suitable exposure, character of soil, etc., will receive careful consideration; also the preparation of soil, its proper fertilization and the rotation of crops thereon, pruning and irrigation.

Winter protection for trees and plants will be a specialty. Instruction will be given in commercial marketing of fruits, assorting and packing, also the construction of fruit packages.

Kitchen gardening will embrace the selection and adaptation of varieties of vegetables, and esculent roots to the various sections of Montana; the construction and operation of greenhouses, hotbeds, cold frames and forcing houses; seed testing, methods of planting and cultivation, the winter care of vegetables, etc.

SECOND YEAR—LANDSCAPE GARDENING. Under this branch will be taught the selection and propagation of shade and ornamental trees, shelter belts, shrubs, vines, flowering plants and lawn grasses, best modes of planting and cultivating; the arrangement of lawns, roads, and driveways, their construction and care.

The orchard, nursery and small-fruit plantations upon the grounds of the experiment station, contiguous to the college grounds, afford excellent opportunity to gain practical ideas of horticulture, and students in this branch can acquire a good working knowledge of fruit culture and ornamental planting.

ZOOLOGY.

PROF. COOLEY.

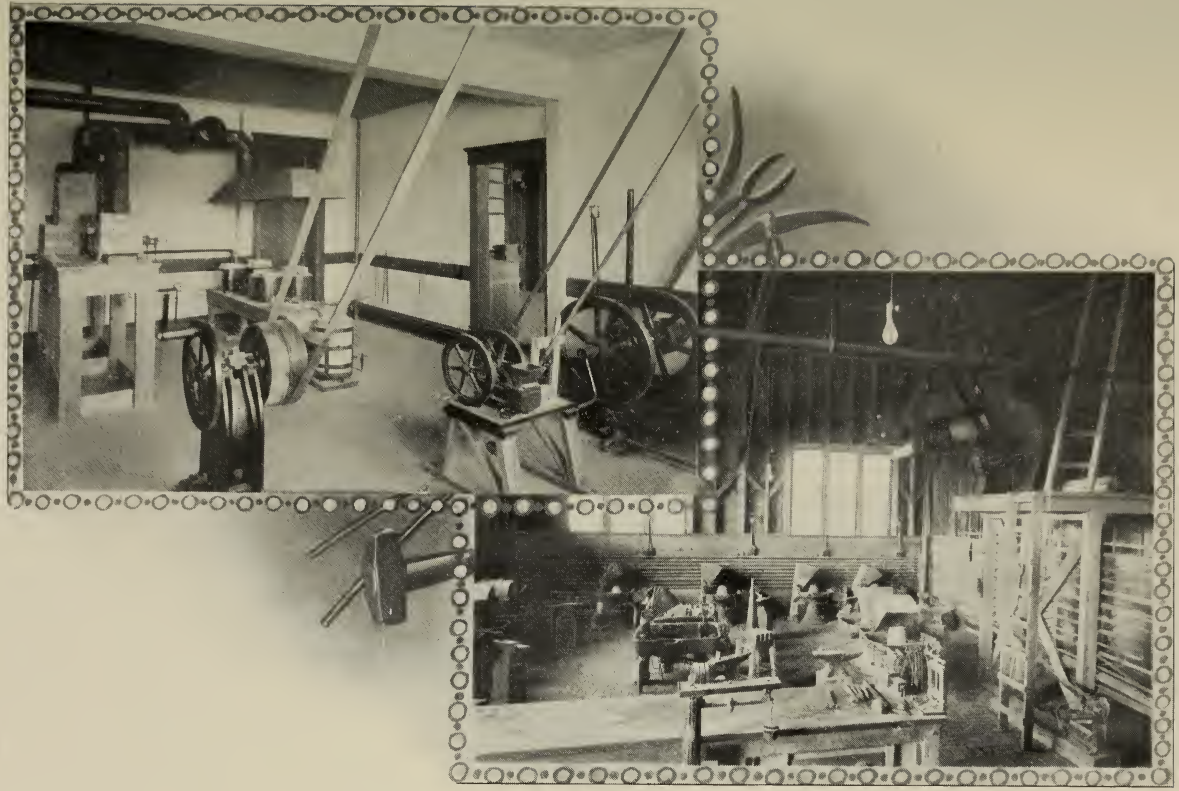
Economic Entomology.—The life-history and habits of the different orders of insects will be treated in lectures so as to enable the student to appreciate the reason for adopting various methods for restraining injurious insects. The external anatomy of insects will be taught by lectures and dissections, so that the student may recognize the orders and know what sort of treatment to apply in any particular case of insect attack. Special consideration will be had of the most noted and destructive insect enemies of various farm and garden crops, as well as of domestic animals, houses, and articles of food. Several lectures will treat of insect-control and the natural and artificial remedies against noxious insects.

AGRICULTURAL CHEMISTRY AND PHYSICS.

DR. F. W. TRAPHAGEN.

This subject treats of the origin, composition and physical properties of the soil, conservation of moisture, and plant food. The composition of animal and vegetable tissues, and the principles of nutrition.

Manufacture and use of fertilizers. The principles of rotation of crops and tillage. The atmosphere as a source



Assay Laboratory

Forge Room

of plant food. The chemical elements contained in the soil, their relation to plants, method and manner of assimilation of plant food. The relation of water to the soil, soil temperature, action of frost, wind and climate on crops.

PRACTICAL MECHANICS.

PROF. W. H. WILLIAMS.

Carpentry.—Use and care of tools; exercises on the most common splices and joints; framing of timber structures. Each student is expected to frame and put together a miniature building of moderate complexity.

The shop exercises will be preceded by lectures in which the strength and theory of the various frames and splices will be discussed.

Forge Work.—This consists of the simple operations of the blacksmith, in which the student will gain sufficient knowledge, if he works conscientiously, to do all the ordinary blacksmithing on the farm.

The work consists of bending, upsetting, and welding, with abundant exercise in a large variety of the most common and simple forms of forgings. Annealing and tempering of steel; methods of sharpening steel tools; construction of punches, drills, chisels, etc. The student is required to spend three hours daily in the shops at forge or bench.

Practical Steam Engineering.—The construction, care and uses of small engines and boilers, especially of the portable and traction style. Care of pumps and injectors used therewith, and how to set valves.

An elementary textbook will be used to give students a fair knowledge of the fundamental principles. For the practical work, the threshing engine and 15 H-P. vertical engine in the engineering laboratory will be used. The course is designed to teach the student to intelligently operate engines and boilers of this class.

This course will extend over thirteen weeks, beginning January 7, 1900. Full particulars will be furnished by applying to President Jas. Reid.

DEPARTMENT OF MUSIC.

PIANO.

Miss Kate Calvin.

In this course special attention is given to thorough technique and correct interpretation, with practical analysis of rhythm and form.

Selections from the following course in piano will be given according to the ability of the student.

Instruction in theory, analysis and history of music will be free to all members of the piano department.

Jadassohn and Emery's Harmony will be used, and those wishing to take a complete course in piano must pass examination in harmony.

Frequent recitals will be given by the students for the purpose of acquiring confidence in playing at public concerts. Pupils will also receive special training in memorizing and sight-reading.

Pupils not capable of advancement will not be encouraged to continue the lessons. Nothing is more unpardonable than for a teacher to permit a pupil to continue work where success can be only partial. Such pupils spend time and money altogether in vain.

No definite time can be fixed for completing this course. Some will make more rapid progress than others, and accomplish in four years what would take others six or eight years to finish.

Students who have done satisfactory work and passed the required examinations will be granted diplomas.

COURSE OF STUDY.

FIRST YEAR.

Fundamental Technique; selections from the five-finger exercises of Plaidy; Melodious Exercises, Enckhausen, Book 1; Duvernoy op. 176, Books 2 and 3; Czerny's Studies, revised by Germer, Book 1, Part 1; Selections from Easier Sonatine and Sonatas of Clementi, Kuhlau, Mozart and Haydn.

SECOND YEAR.

Daily Technique; Czerny—Germer Studies, Books 1 and 2; Major and Minor Scales; Heller op. 47, Book 2; Felix Le Couppey, op. 20 and op. 26; Loeschorn's School of Velocity, Books 1 and 2; 12 Kleine Praludien, Bach; Miscellaneous Classics from Mozart, Haydn, Beethoven, Schuman and Mendelssohn.

THIRD YEAR.

Daily Technique; Germer Studies, Book 2; School of Velocity, Loeschorn, Books 2 and 3; Two Voice Inventions, J. S. Bach; Concertos, Mozart; easier ones of Beethoven; Miscellaneous Classics; Sonatas of Hummel, Nocturnes—Nos. 3 and 5, Field; Selections by Bach, Mozart, Handel, Beethoven, Schubert, Mendelssohn, Schumann, Chopin; also from Grieg, Godard, the Scharwenkas, Paderewski and other modern composers.

FOURTH YEAR.

Daily Technique Studies; Moscheles op. 70, op. 25; Cramer op. 84; Czerny's Virtuoso School, Book 1, op. 365; Fugues by Bach; Czerny's School for the Left Hand, op, 718; Gradus by Clementi; Concertos, Mendelssohn and Beethoven; Miscellaneous Classics; also selections from modern composers.

TUITION.

For class lessons, two lessons per week throughout the year	$45.00
For class lessons, two lessons per week for one semester	22.50
For private lessons, one lesson per week throughout the year	51.00
For private lessons, one lesson per week for one semester	25.50

Harmony for five or more students, $15.00 for the entire academic year (one lesson a week).

Piano Rent.—Two periods each day, $10.00 per year.

Special Regulations.—In class lessons no reduction will be made for any pupil who enters late in the term, for temporary absence, or for withdrawal before the close of the term.

In private lessons, no allowance will be made for omitted lessons except in case of protracted illness, and in such cases due notice must have been received as early as the day before the lesson day.

GENERAL INFORMATION.

FEES AND DEPOSITS.

Preparatory, or any college course, per semester	$ 6.00
Short course in agriculture	5.00
Short course in home science, per semester	6.00
Physical apparatus (deposit)	5.00
Freshman chemistry (deposit)	15.00
Quantitative apparatus (deposit)	25.00
Assaying apparatus and fuel	30.00
Mineralogy, including apparatus and 175 minerals	10.00
Shop courses (deposit per year)	7.00
Deposit for art work, per year	2.00
Domestic science, cooking course, per semester	1.50
Botanical laboratory, per semester	1.50
Zoological laboratory, per semester	1.50
Engineering laboratory (deposit)	10.00

All fees and deposits must be paid in advance to the secretary of the faculty. Students will not be permitted to enter classes until such payments have been made.

At the end of the year the student may return such apparatus as has not been damaged and receive in return the balance of his deposit less the cost of materials.

General Expenses.—The total expenses for the year may be estimated at about $175.00. There are no dormitories connected with the college. Students can find rooms and board in private families. Good homes can be obtained at very reasonable rates. Board and room may be had for fifteen dollars per month and upwards. Students may lessen expenses by forming clubs. A boarding club for lady students will be organized in September, 1900.

Students are required to board in places approved by the faculty.

New Students.—Students intending to enter the College are requested to notify the president or some member of the faculty a few days before coming to Bozeman.

Attendance.—Prompt attendance at all recitations, lectures and regular exercises of the College is required of every student.

Students are expected to attend the weekly Assembly, at which lectures are delivered by members of the faculty and others.

Students whose absences exceed five per cent. of the total number of recitations or lectures, in any subject, will not be allowed to take the regular examinations in that subject without presenting a satisfactory excuse to the faculty.

Examinations.—Frequent examinations are required of every student, so that the standing of each student may be readily ascertained at any time.

Reports are mailed to parents at the end of each semester.

Irregular Students.—Some latitude in selecting studies will be allowed to irregular students, although any departure from the regular prescribed courses will be discouraged as a rule. Students desiring to take special courses must first obtain the consent of the faculty, and their choice of subjects must be made to conform to the schedule of class work, which will be published before the beginning of each term.

Government.—Students are expected to conduct themselves as ladies and gentlemen; those who fail to comply with this demand will be requested to leave the institution.

Students must not leave the institution without reporting to the president, either in person or by writing. Any student transgressing this rule is thereby suspended from College; he will not be readmitted another term or year, nor will any reports or grades in credit for work done here be sent to him until a satisfactory explanation is made.

The work of each student is under the direct supervision of some member of the faculty called a class officer.

General Culture.—The professor of domestic science will from time to time give lectures to the young ladies on various topics connected with general culture.

Graduate Study.—The following institutions accept the work of graduates of our College as the equivalent of their own work in the branches covered, and accept our certificates in lieu of examinations in such subjects: Columbia College, Barnard College, School of Applied Science and Teachers' College of Columbia University; and College of Engineering, University of Wisconsin.

LITERARY SOCIETIES.

Two successful literary societies, the Arena and the Clioian, exist under the auspices of the College.

They are given the benefit of the faculty's co-operation to the fullest extent possible, one of its representatives being present at every meeting to give aid by counsel and suggestion. All students are encouraged to join one of these societies. Under this system great progress has been made.

Some of the features of the work of these societies are joint debates and literary contests.

During the past year there has been organized an oratorical association, which conducts an annual oratorical contest here and co-operates with similar associations in the other institutions of the state in holding an annual state contest. The first state contest was held in May, 1900.

THE COLLEGE EXPONENT.

This is a monthly journal, maintained by the students, and serves to give valuable training in English to the members of the editorial board and contributors, besides being the means of bringing the work of the College before a large body of readers throughout the state.

ATHLETICS.

Believing in the importance of athletics in their relations with college work, field sports and gymasium practice are encouraged. Each year during commencement week one day is set aside for athletic contests. Great interest has centered in this day in the past, and the excellent health possessed by the students is attributable, in large part at least, to the systematic exercise taken in preparation for these events.

The arrangements for field day sports, for baseball, football and basketball games, including practice, are in the hands of the Athletic Association, composed of students and members of the faculty.

The following rule has been passed by the faculty for the regulation of athletic contests: No student shall represent the College in any inter-collegiate or other outside contest who has not been in attendance at the College for at least one month prior to such contest or from the beginning of the year, and who shall not be carrying at least ten hours of lecture or recitation work or its equivalent, and maintaining a passing grade for the semester.

LIBRARY.

The library occupies two large, well-lighted rooms, on the first floor of the main building, and contains about 4,700 well selected volumes and about 3,000 pamphlets. Its shelves are well supplied with the standard works of history, science and literature. About $1,200 is spent yearly on books and magazines.

The reading room is furnished with the following journals, periodicals and magazines:

American Chemical Journal,
American Electrician,
American Geologist,
American Journal of Pharmacy,
American Journal of Science,
American Kitchen Magazine,
American Machinist,
American Veterinary Review,
Analyst,
Anatomischer Anzeiger,
Annals of Botany,
Anthony's Photographic Bulletin,
Astronomical Journal,
Atlantic Monthly,
Botanical Gazette,
Botanisches Centralblatt,
Breeders' Gazette.
Bulletin of Am. Acad. of Med.
Bulletin of the Torrey Bot. Club,
Butte Business Educator,
Canadian Entomologist,
Cassier's Magazine,
Century Magazine,
Chemical News,
Climate and Crop Service, Montana Section.
Collier's Weekly,
Cosmopolitan,
Delineator,
Department of Labor,
Education,
Educational Review,
Electrical Review (N. Y.),
Electrical World and Engineer,
Electrician (London),
Engineering (London),
Engineering and Mining Journal,
Engineering Magazine,
Engineering News,
Entomological News,
Experiment Station Record,
Farmer,
Farm Home,
Farming,
Field and Farm,
Fliegende Blaetter,
Forester,
Forum,
Good Health,
Good Housekeeping,
Good Roads,
Harper's Bazaar,
Harper's Magazine,
Harper's Weekly,
Heating and Ventilation,
Homestead,
Household News,
Industrialist,
Irrigation Age,
Jahresbericht ueber d. Fort. der Chem. etc.,
Journal Illustre,
Journal of American Chem. Soc.
Journal of Comp. Medicine,
Journal of Franklin Institute,
Journal of the Inst. of Elec. Eng.
Journal of the Mil. Serv. Inst.,
Journal of London Chem. Soc.
Journal of Morphology,
Journal of Pedagogy,
Knowledge,
Ladies' Home Journal,
Library Journal,
Literary Digest,
Literary News,
Locomotive Engineering,
Machinery,
Magasin Illustre d' Education,
Medicine,
Mining Scientific Press,
Monthly Weather Review,
National Geographic Magazine,

Library

National Stockman and Farmer,
Nature,
North American Review,
Northwest Instructor,
Northwestern Jour. of Education,
Northwest Magazine,
Orange Judd Farmer,
Outing,
Patent Office Gazette,
Photo-Beacon,
Photo-Era,
Photographic Times,
Popular Science Monthly,
Poultry Monthly,
Power,
Publishers' Weekly,
Ranch and Rancher,
Review of Reviews,
Rural New Yorker,
School of Mines Quarterly,
Science,
Science Gossip,
Scientific American Supplement,
Scribner's Monthly,
Sound Money,
Southern State Farm Magazine,
Steam Engineering,
Street Railway Review,
Success,
Sunshine,
Table Talk,
The Dial,
The Scroll,
Transactions Amer. Inst. E. E.
Transactions Amer. Inst. Min. E.,
Transactions Amer. Soc. C. E.
Transactions Amer. Soc. Mech. E.,
Transactions Assoc. Eng. Socs.,
Transactions West. Soc. of Engrs.,
Ueber Land und Meer.
Veterinarian,
Veterinary Journal,
Veterinary Magazine,
Woman's Home Companion,
Youth's Companion,
Zeitschrift fur Anal. Chem.,
Zoologischer Anzeiger,
Zoologist.

The reading room is also supplied with the following daily and weekly newspapers, most of them being donated:

Avant Courier,
Alder Gulch Times,
Belt Valley Times,
Big Timber Pioneer,
Billings Gazette,
Boulder Age,
Bozeman Chronicle,
Butte Miner,
Carbon County Sentinel,
Dillon Tribune,
Farmer's Voice,
Great Falls News,
Helena Herald,
Helena Independent,
Indiana Farmer,
Inter Lake,
Inter Mountain,
Madisonian,
Montana Fruit Grower and Farmer,
Neihart Herald,
Northern Agriculturist,
Park County Republican,
Red Lodge Picket,
Rocky Mountain Husbandman,
St. Paul Dispatch,
Salt Lake Tribune,
Saturday Review,
Townsend Messenger,
Yellowstone Leader.

DEGREES CONFERRED.

COMMENCEMENT, JUNE, 1899.

BACHELOR OF ANALYTICAL CHEMISTRY,

Thomas O. Caldwell ... Spring City, Tennessee.

BACHELOR OF MECHANICAL ENGINEERING,

Frank B. Williams ... Wickes.

CATALOG OF STUDENTS, 1899-00.

THE COLLEGE.

SENIORS.

Cockrill, Irvin	Bozeman	Chemistry.
Freeman, Beatrice	Bozeman	General Science.
Maynard, Edna	Ennis	General Science.

JUNIORS.

Jones, Wyatt Wagner	Bozeman	General Science.
Koch, Elers	Bozeman	General Science.
Monforton, Zoe	Bozeman	Home Science.
Moore, Ellie J. S	Belgrade	General Science.
Sloan, William Frank	Bozeman	Elect. Engineering.
Waters, Herman	Bozeman	Elect. Engineering.

SOPHOMORES.

Collins, Walter E	Helena	General Science.
Cowan, Vina	Bozeman	General Science.
Freeman, William Bradley	Bozeman	Mech. Engineering.
Hutton, Fred	Ennis	Elect. Engineering.
Quaw, Mignon M	Bozeman	General Science.
Reese, Herbert J	Livingston	Chemistry.
Schabarker, William	Bozeman	Mech. Engineering.
Spragg, Frank A	Benton	Agriculture.
Thompson, Homer C	Bozeman	General Science.
Willson, Frank G	Bozeman	Mech. Engineering.
Williams, Lee	Deer Lodge	Mech. Engineering.

FRESHMEN.

Brown, Fred Melvin	Bozeman	Mech. Engineering.
Davidson, Polly G	Bozeman	General Science.
Davidson, Jesse Anselm	Bozeman	Elect. Engineering.
Flaherty, Charles D	Cold Springs	Mech. Engineering.
Flaherty, William Alfred	Cold Springs	Elect. Engineering.
Gardiner, Henry C	Bozeman	Agriculture.
Koch, Stanley	Bozeman	Mech. Engineering.
Lamme, Maurice Allison	Bozeman	General Science.
Lewis, Edna	Bozeman	General Science.
Morris, Garfield T	Bozeman	Mech. Engineering.

Quaw, Lucile	Bozeman	General Science.
Railey, Oliver	Castle	Mech. Engineering.
Sloan, James Henry	Bozeman	Mech. Engineering.
Stevenson, Arthur	Bozeman	General Science.
Schmitt, Fred	Lewistown	General Science.
Tavenner, Frank Lucius	Ubet	Mech. Engineering.
Wood, James L	Radersburg	Chemistry.

IRREGULAR.

Ballinger, Florence	Livingston	Art.
Burk, Edmund	Bozeman	Chemistry.
Clark, Clara	Butte	Chemistry.
Corbett, Lynne R	Highland Park, Ill.	Art.
Draper, C. W	Bozeman	Chemistry.
Ferris, Margaret M	Bozeman	Art.
Gottschalck, Ellen	Bozeman	General Science.
Hartman, F. Madge	Bozeman	General Science.
Jones, Burle	Bozeman	General Science.
King, Lowell Rufus	Bozeman	General Science.
Lewellen, John D	Gallop	General Science.
Morris, W. B.	Florence, Idaho	Chemistry.
Norman, Margaret	Bozeman	Art.
Parker, Charles C	Deer Lodge	Chemistry.
Penwell, Florence	Bozeman	Art.
Waters, Foley L	Bozeman	General Science.

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PREPARATORY DEPARTMENT.

THIRD YEAR.

Crouse, Minnie	Spring Hill.
Davidson, Edward W	Bozeman.
Davidson, Reuben	Manitou, Manitoba.
Francisco, Belle	Sixteen-Mile.
Imes, John W	Bozeman.
Kenyon, Ursula	Camas Valley, Ore.
Kinney, Edward	Bozeman.
Knadler, Edwin	Belgrade,
Lamme, Clinton	Bozeman.
Lewis, Clyde	Crow Agency.
Locke, Jerome	Livingston.
Martin, James	Bozeman.
Maxwell, Seth	Townsend.
Moore, Icie	Belgrade.
Noble, Laviga	Jefferson Island.
Penwell, Carrie C	Belgrade.
Provinse, Estella	Roberts.
Robinson, William	Bozeman.
Sherman, Dora	Fayette, Idaho.
Smith, Kirk	Livingston.
Stiff, Maude	Bozeman.
Woodward, Grace	Willow Creek.
Wylie, Mary Grace	Bozeman.

SECOND YEAR.

Bailey, Dollie S	Big Timber.
Woodward, Eugene	Willow Creek.

FIRST YEAR.

Adams, William J.	Butte.
Alloway, C. P.	Tiffin, Iowa.
Ayotte, John	Virginia City.
Baker, Harry	Castle.
Barter, Hilda	Red Bluff.
Bell, Allie	Pony.
Blowers, Erma	Meyersburg.
Carmin, Chas. E.	Pony.
Conrow, Carruth	Bozeman.
Coryell, Lida	Bozeman.
Coursien, Frankie	Bozeman.
Davis, Charles	Belgrade.
Davis, Stanley	Belgrade.
Davis, Bertha	Bozeman.
Davis, Garfield	Bozeman.
Ervin, Fred	Callaway, Nebraska.
Flaherty, Richard	Cold Springs.
Gray, Chas. E.	Bozeman.
Green, Jennie	Bozeman.
Huffine, Monroe	Bozeman.
Huffine, Floyd	Bozeman.
Hughes, Edward	Aldrich.
Hutton, Horace P.	Ennis.
Jackson, Oliver Chas.	Divide.
Jackson, Rollin	Harrison.
Jackson, Faith	Harrison.
Jacobs, Fannie	Bozeman.
Lundwall, Olof	Bozeman.
Lyon, Theodocia	Bozeman.
Lyon, Anna	Lyon.
Noble, Delore	Jefferson Island.
Penwell, Clyde	Belgrade.
Quaintance, Roy	Boulder.
Ray, Willis E.	Bozeman.
Reese, Lester	Bozeman.
Roberts, George	Harrison.
Schmidt, Otto	Salesville.
Stanton, Belle	Bozeman.
Walker, Lilly May	Augusta.
Woodward, Mabel	Willow Creek.

IRREGULAR.

Anderson, Hugo	Bozeman.
Arnold, Ella	Bozeman.
Cockrell, Moncure	Deer Lodge.
Collins, Charles	Billings.
Cooke, Margaret	Bozeman.
Corson, Theotiste	Bozeman.
Danils, J. H.	Neihart.
Davis, James	Bozeman,
Farris, Herbert	Springfield, Mo.
Feeley, Kathryn A.	Red Lodge.
Gardner, Carrie P.	Bozeman.
Haynes, George S	Clancy.
Henderson, Claude	Bozeman.

Henry, Merrill	Livingston.	
Holgate, Ralph	Manhattan.	
Jackson, Edith	Harrison.	
Jones, Bertha I.	Bozeman.	
Lansing, Gerald	Bozeman,	
Lovall, Roy	Bozeman.	
McClain, Rolfe V.	Butte.	
*Mills, Elizabeth	Bozeman.	
Mills, Thomas	Ethel, Mo.	
Nelson, Gustav	Bozeman.	
Oakwood, Mamie	Bozeman.	
Scholten, Dora	Wormser.	
TeSelle, Minnie	Manhattan.	
Traphagen, Gertrude	Bozeman.	
Trent, Harley	Bozeman.	
Warner, Mabel	Harrison.	
Warren, Albert A	Willow Creek.	
Waters, Mary	Bozeman.	
Wisner, Maude	Bozeman.	

HOME SCIENCE.

Bronner, Stella	Meadow Creek.	
Davis, Martha	Bozeman.	
Elliott, Bessie	Highfield.	
Fisher, Lulu	Springfield, Mo.	
Gay, Eldorado	Livingston.	
Gottschalck, Camilla	Bozeman.	
Hills, Marie	Bozeman.	
Lee, Kate E	Bozeman.	
Loughridge, Ethel	Bozeman	106

SHORT COURSE IN AGRICULTURE.

Blankenship, Houston	Bozeman.	
Boomer, Wilbur	Bozeman.	
Conroy, S. E.	Bozeman.	
Conroy, E. L.	Bozeman.	
Day, Walter E	Bozeman.	
Kruse, Jacob	Bozeman.	
Marston, Lee	Bozeman.	
Pattee, John E	Bozeman.	
Scheytt, Frank	Springhill.	
Sprague, Robert	Bozeman.	
Tracy, Frank	Bozeman.	
Wilson, Lee	Bozeman	12

BUSINESS DEPARTMENT.

ADVANCED BOOKKEEPING.

Hancock, Helen	Bozeman.
Jones, Orville	Bozeman.
Parkins, William E	Sheridan.
Tracy, Albert C	Bozeman.

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*Deceased.

BOOKKEEPING.

Arnold, Louis G	Bozeman.	
Elliott, J. A	Highfield.	
Esgar, Frank H	Bozeman.	
Fransham, Rhesis	Bozeman.	
Godson, Eliza	Bozeman.	
Jeffers, Clarence W	Ennis.	
Jeffers, G. Clifford	Ennis.	
Kreiling, Anna M	Bozeman.	
Linney, Lola	Bozeman.	
Loughridge, A. Harry	Bozeman.	
Mileham, E. H	Bozeman.	
Miller, John C	Merrill.	
Nihill, Lizzie	Philbrook.	
Oakwood, Jake F	Bozeman.	
Patterson, Harry C	Manhattan.	
Provinse, W. D	Bozeman.	
Rich, Rex R	Hunter Hot Springs.	
Steffins, Claude P	Bozeman.	
TeSelle, Lena	Bozeman.	
Williams, David F	Radersburg.	

STENOGRAPHY AND TYPEWRITING.

Arnold, Annie	Bozeman.	
Corson, Alice	Bozeman.	
Flowers, Blanche	Bozeman.	
Flowers, Annabel M	Bozeman.	
Gage, Lucy E	Bozeman.	
Proffitt, Carrie Mae	Bozeman.	
Monforton, Mary A	Bozeman.	
Kountz, John I	Bozeman	32

MUSIC.

Anderson, Vera	Bozeman.	
Clark, Clara	Butte.	
Coursien, Frankie	Bozeman.	
Elliott, Bessie	Highfield.	
Feeley, Kathryn	Red Lodge.	
Fell, Ada	Bozeman.	
Hills, Marie	Bozeman.	
Matthews, Madge	Bozeman.	
McDonald, Grace	Bridger.	
*Mills, Elizabeth	Bozeman.	
Wylie, Grace	Bozeman.	
Yerkes, Beulah	Bozeman.	
Yerkes, Paul	Bozeman.	13

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*Deceased.

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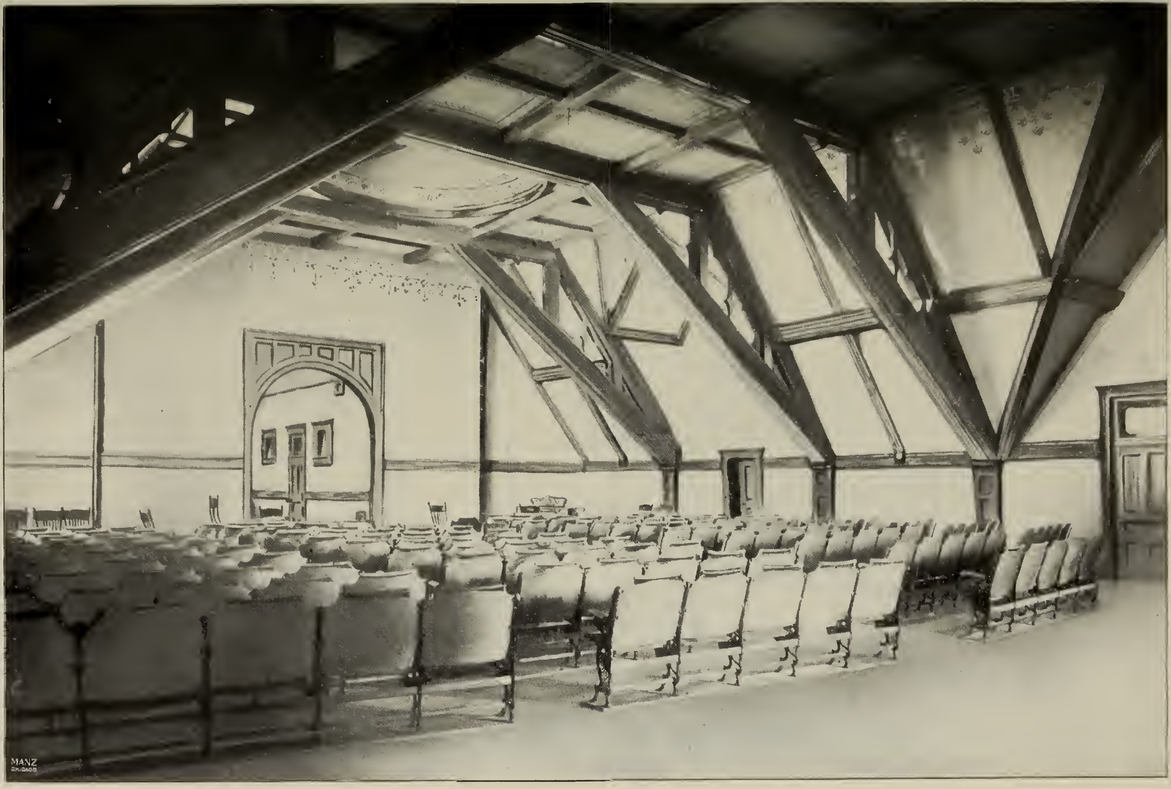

ASSEMBLY ROOM

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